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# Editorial

Prof. Dr. K. Rajeshwar Reddy

## Doctors and Medical Profession

Medical profession is the most noblest, dedicated and challenging career with great social responsibilities and commitments.

Medicine is a learned and humane profession, deeply rooted in a number of sciences and charged with the obligation to apply them for man's benefit.

Medicine is a mutable body of knowledge, skills and traditions applicable to the preservation of health, the cure of disease and the amelioration of suffering.

The boundaries of medicine blend into psychology, sociology, economics and even cultural heritage.

The doctor is not a disembodied instrument that can be passively shaped by the profession, but rather a human being with innate strengths and weaknesses that must be recognized in order to meet the expectations of patients and of the profession.

The practice of medicine is far more than the application of scientific principles to a particular biologic aberration.

A doctor may be defined as one trained in the principles and practice of medicine, possessing uncommon knowledge of biological science ranging from molecular events to whole organ system physiology, a special appreciation for human life and the needs of suffering people, and a comprehensive perspective on modern society-its influence on our lives and its stress on our social structure.

The good physician – the one patients' seek – must combine working scientific techniques with compassion and social responsibility and apply them in interaction with patients and their families.

The humanistic physician is one who –

1. Respects the patient's view points and considers his/her opinions when determining health care decisions.
2. Attends to the psychological well-being of the patient.
3. Regards the patient as an unique individual.
4. Treats the patient in the context of his or her family and social and physical environment.
5. Possess good communication and listening skills.
6. Engenders trust and confidence.
7. Demonstrates warmth and compassion, and
8. Is empathetic.

The frontline doctors will have four main roles to play –

- 1) care-givers – besides giving individual treatment, frontline doctor should take into account the total needs (physical, social and mental) of the patient.
- 2) decision makers – a doctor has to take decisions in a climate of transparency that can be justified in terms of efficacy and cost; as limited resources available for health must be shared out fairly to the benefit of every individual in the community.
- 3) communicators – the doctors of tomorrow must be excellent communicators in order to persuade individuals, families and the communities in their charge, to adopt healthy life styles and become partners in the health efforts.
- 4) community leaders – the frontline doctor will not simply be treating individuals who seek help but will also take a positive interest in community health activities which will benefit large numbers of people.

The description of a patient is simply that of a fellow human being in need of help. The patient comes seeking help because of a problem relating to his or her health. People who need medical care ask the following questions throughout the world everyday.

How can I find a good doctor?

How can I find a good doctor whom I can afford?

How can I find a good doctor who cares about me as a person?

How can I find a good doctor who will take the time to listen and understand?

Patients and public ask these questions because they face a health care system that is scientifically complex, organizationally overloaded, and generally not oriented to the patient as a person. When an individual first becomes ill, regardless of the symptoms, he or she needs most someone who seems to say, “I am a good doctor; I charge a reasonable amount for my services; I care about you, the patient; and I will take the time to listen and understand”

Patients are concerned about the rising cost of medical care. Patients want to be listened to and understood. Patients want doctors to be interested in them as fellow human beings. Patients expect professional competence in medical science and technology. Patients want to be kept informed. Patients want not to be abandoned.

The doctor has both chosen and been chosen to enter an arduous and demanding profession. The doctor enters a profession with established values and traditions of ethical conduct and responsibilities. But each doctor, like each patient is unique.

The qualities of an ideal doctor are easy to state but difficult to attain : compassion, sincere interest in one’s fellow men, knowledge of human nature, tact, equanimity, sustained scholarship, curiosity and high ethical standards. Medical ethics touches almost every aspect of health and the practice of medicine. Ethics are the rules of the right conduct or practice in a profession. Physical and mental vigor might be added to those traits. No one has been endowed with or ever fully achieves excellence in all of these qualities. One must first know oneself and judge how one can most closely approach those ideals in one’s professional life.

The professional attitude of the doctor is not only concerned with his feelings, beliefs and behavior towards the patients, but also towards other elements of professional functioning like health care delivery, scientific interest and collaboration with other professionals.



# Age Does Not Affect Operative Times and Hospital Stay for Laparoscopic Cholecystectomy

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## Key words:

Laparoscopic  
Cholecystectomy, Geriatric,  
Conversion

## ABSTRACT

**Objective:** Laparoscopic cholecystectomy (LC) in patient group of > 65 years is safe.

**Method:** This was a prospective controlled study from 01-01-2007 to 31-9-2011 that included all cases posted for LC (symptomatic cholelithiasis, GB polyps, acute calculus or acalculus cholecystitis) in CHRC. Control group was defined as age <65 (n=668) and study group was defined as age ≥65 (n=76). Parameters evaluated were age, sex, comorbid disease (hypertension, cardio-vascular disease, or diabetes), previous abdominal surgery, operative time, conversion rate to open cholecystectomy (OC), complications and length of hospital stay. SPSS version 10 (SPSS, Chicago, IL, USA) was used for all statistical analyses. Values with p<0.05 were considered significant.

**Result:** Total of 714 patients were divided into group 1 as the control group (age < 65 years) that consisted of 668 cases and group 2 as the study group (Age ≥ 65 years) that consisted of 76 cases. The majority of the patients in both groups were females (p <0.018). Acute cholecystitis was significantly higher in group 2 (Age ≥ 65 years) (p<0.001). Most common indication for (LC) in both groups was symptomatic cholelithiasis. Conversion to open cholecystectomy in group 1 was 5.08% and in group 2 was 13.15% (p= 0.041). There was no statistically significant difference in the operative time and hospital stay among the two groups. In both the age groups, the most common reason for conversion was intense fibrosis or dense adhesions. Post operative complications were 10.02% in group 1 and 13.15% in group 2. However, this difference was not statistically significant (p=0.315). There was no mortality in either group.

**Conclusion:** Despite underlying co morbidities, laparoscopic cholecystectomy is feasible and safe in elderly patients. Age alone should not be the contraindication for laparoscopic cholecystectomy.

## INTRODUCTION

Recent 2011 July data shows that 4.4% of Nepal population is

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older than 65 years while in US it is about 15%. The population of persons older than 80 years has increased by 66% during the last century. Fifty percent of women and 16% of men in their 70s have been shown to have gallstone disease, and 20% of the abdominal procedures performed in those older than 80 years are hepatobiliary. Despite the known socioeconomic effect of laparoscopic cholecystectomy (LC) that is superior to that of the open procedure, the approach to elderly patients with

gallstone disease has remained controversial in the medical community. Strong consideration has been given to the non-operative treatment of gallstone disease in elderly patients.<sup>1,2</sup> In 1999, Howard and Fromm<sup>2</sup> reviewed the management of gallstone disease, citing a mortality of 12% for patients older than 80 years. They did not find any evidence that mortality is lower with laparoscopic surgery. Some other publication shows cholelithiasis occurs almost 3 to 20% of the world population<sup>3</sup>. It is the most common abdominal surgical disease in the elderly, with prevalence of 21.4% for the aged 60 to 69 years and 27.5% in individuals aged over 70 years<sup>4</sup>. The symptoms are absent between 50% and 77% of cases<sup>5,6</sup>. Laparoscopic cholecystectomy (LC) is considered the gold standard treatment for this disorder. Cholecystectomy is the most frequent abdominal operation and its employment in the elderly varies between 8.3% and 24%<sup>2</sup>. It was estimated that 90% of cholecystectomy were performed by the laparoscopic access in USA in the year 1992<sup>7</sup>. Although aging seems to have a negative influence on surgical outcome, most publications show that the chronological age alone is irrelevant. In reality, the decline of functional reserves, the more frequent presence of co morbidities, chronic and complicated biliary disease, such as acute cholecystitis and biliary pancreatitis – commonly associated with calculi of the common bile duct – are the greatest responsible for causing potential increase in perioperative morbidity, mortality and need for conversion to open technique. Therefore, elective surgical treatment is recommended for the clinically symptomatic elderly, as long as they are compensated<sup>4</sup>. Age is one of the critical factors affecting the mortality and morbidity rates after open cholecystectomy (OC)<sup>8</sup> too. The use of a laparoscopic approach in ageing patients may pose problems because the comorbid conditions that are concomitant with advanced age may increase the postoperative LC complications and the frequency of conversion to open surgery<sup>9</sup>. The present study evaluates the outcomes in an elderly population at a time when LC has become the gold standard for patients with symptomatic gallstone disease.

## METHODS

Data of all 714 patients undergoing an LC from January 2007 through September of 2011 were reviewed. The patients were divided into two groups based on age: group 1, patients younger than 65 and group 2, patients 65 years or older. The following parameters were evaluated: age, sex, comorbid disease (hypertension, cardiovascular disease, or diabetes), history of previous hospitalization for acute cholecystitis, previous abdominal surgery, operative time, conversion rate to open cholecystectomy (OC), complications, and length of hospital stay. The hospital stay was calculated as the period from the admission day until discharge from the hospital. All patients who were scheduled for LC for symptomatic cholelithiasis, GB polyps, acute calculus or acalculus cholecystitis were included in this study. All patients were sent for pre anesthetic check up and ASA I-III was included in this study. Those with history of pancreatitis, jaundice, common bile duct dilatation (>8mm in

diameter on USG-), choledocholithiasis, GB Wall thickness more than 1cm, H/O of upper abdominal surgery, inability to create pneumoperitoneum and obvious gall bladder mass were excluded.

Laparoscopic cholecystectomy was performed using a standard four-port technique for difficult cases and most of cases were performed by three port technique. Pneumoperitoneum was created using a direct blunt trocar or Veress needle.

SPSS version 10 was used for all statistical analyses. Differences between the groups were determined by Mann-Whitney U and Pearson chi-square tests where appropriate. Quantitative variables were expressed as the median and range, and qualitative variables were expressed as frequencies and percentage. Values with  $p < 0.05$  were considered significant.

## RESULT

Total 714 patients underwent LC within this study period. Among them, group 1 (age < 65 years) were 668 of which 153 (22.91%) were male and 515 (77.09%) were female. Total patients in age group 2 (Age  $\geq$  65 years) were 76. 26/76 (34.21%) were male and 50/76 (65.79%) were female. The demographic and preoperative data are presented in **table 1**. The majority of the patients in both groups were females, the female/male ratio was significantly higher in age group 1 (<65 years), ( $p < 0.018$ ). Acute cholecystitis was significantly higher in age group 2 (Age  $\geq$  65 years) ( $p < 0.001$ ). Cardiovascular disease, ( $p < 0.001$ ), hypertension ( $p < 0.001$ ) and diabetes mellitus, ( $p = 0.002$ ) were the most common ancillary diseases; all of these were more frequent among elderly patients. Most common indication for LC in both groups was symptomatic cholelithiasis.

LC outcome according to age is shown in **table 2**. Conversion to open cholecystectomy in group 1 was 5.08% and in group 2 was 13.15%; significantly higher in age group 2 ( $p = 0.041$ ). Operative time and hospital stay did not have any statistical difference.

In both the age groups, the most common reason for conversion was failure to adequately visualize the biliary tract anatomy due to intense fibrosis or dense adhesions due to prior laparotomy that prevented a laparoscopic approach around the gallbladder and Calot's triangle. Other reasons for conversion to open surgery in this study were intraoperative liver bed bleeding uncontrollable laparoscopically, injury to the bile duct and instrumental failure. The indications for conversion according to age groups are given in **table 3**.

Post operative complications were 10.02% in age group of <65 years and 13.15% in age group of  $\geq$ 65 years old patients. However this difference was not statistically significant ( $p = 0.315$ ). The distribution of the complications according to age groups is given in **table 4**. No mortality was seen in either groups.

**Table 1.** Preoperative status of patients undergoing laparoscopic cholecystectomy according to age

Preoperative factor	Age < 65years	Age ≥ 65years	P value
Number of patients	668	76	
Gender			<0.018
Male	153(22.91)	26(34.21)	
Female	515(77.09)	50(65.79)	
Cardiovascular disease	17(2.5)	11(14.5)	<0.001
Diabetes	34(5.1)	9(11.84)	0.002
Hypertension	86(12.9)	20(26.32)	<0.001
Previous abdominal surgery			0.534
None	512(76.7)	60(78.94)	
Lower	156(23.35)	16(21.05)	
Acute cholecystitis	66(9.9)	16(21.05)	<0.001
G B Polyp	78(11.67)	7(9.2)	0.596
Symptomatic cholelithiasis	524(78.44)	53(69.73)	0.214

Values in the bracket is the percentage (%)

**Table 2.** Laparoscopic cholecystectomy outcome according to age

	<65 years	≥ 65years	P value
Operative time(min)	45(20-160)	50(25-195)	0.085
Hospital stay(days)	4(3-11)	4(3-11)	0.081
Conversion rate	34(5.08)	10(13.15)	0.041
Complication	67(10.02)	10(13.15)	0.315

Values in the bracket is the percentage (%)

**Table 3.** Reasons for the conversion to open cholecystectomy .

Reason	<65 years (n=34)	≥ 65years (n=10)
Dence adhesions (inadequate exposure)	25(73.53)	5(50)
Bile duct injury	2(5.88)	1(10)
Massive oozing from liver bed	3(8.82)	2(20)
Instrumental failure	2(5.88)	1(10)
Choledochoduodenal Fistula	2(5.88)	1(10)

Values in the bracket is the percentage (%)

**Table 4** Complication of Surgery

Complication	<65 years(n=67)	≥ 65years(n=10)
Bile duct injury	2 (2.98)	1(10)
Postoperative bleeding	1(1.49)	0
Port site infection	24(35.82)	3(30)
Bile leak	0	1(10)
Atelectasis/chest infection	19(28.35)	1(10)
Myocardial ischemia	1(1.49)	1(10)
Arrythmia	7(10.44)	1(10)
Urinary tract infection	13(19.4)	2(20)

Values in the bracket is the percentage (%)

## DISCUSSION

The laparoscopic cholecystectomy is the gold standard for treatment of cholelithiasis in elderly patients<sup>6</sup>. It is an operation that was widespread in Nepal and all over the world in recent decades. The age of patients is a factor that has worried surgeons. However, this variable alone is not able to preclude laparoscopy<sup>7</sup>. The most relevant aspect is the presence of co morbidities with age progression<sup>10</sup>. The management of gallstones has changed dramatically since the introduction of laparoscopic cholecystectomy.<sup>11</sup> Acute complications of gallstone are found more commonly in the elderly population<sup>12</sup> and there is an increased incidence of co-existing medical problems, making them unsuitable candidates for surgical intervention. Laparoscopic surgery has gained worldwide popularity and acceptance because of such advantages as minimal trauma and physiological dysfunction, shorter hospital stay, and early return to normality.<sup>13-19</sup> These advantages of laparoscopic surgery are highly desirable in elderly subjects where comorbidities often make surgery hazardous and difficult.

In the elderly who underwent laparoscopic cholecystectomy, complication rates of 5% to 15% and an overall mortality rate of 0% to 1% have been observed<sup>9,10,38</sup>. There was no mortality in our study. Although the complication rates were slightly higher in the group2( age ≥ 65years) compared with the younger group of patients (13.15% vs 10.02%, P\_0.315), these figures are still lower than the reported complication rates for open cholecystectomy. The associated morbidities in our study population are almost the same as reported by other similar studies<sup>20,21</sup>.

Several retrospective studies<sup>9,22, 23, 25, 27, 29, 30, 31, 20</sup>, and one prospective randomized trial<sup>24</sup> have evaluated the results of LC in elderly patients. Most of these studies have been small, and in only one report<sup>29</sup> was the focus on outcomes

in elderly people. In general, these reports have shown that most elderly patients undergoing LC have done well, but when compared with younger individuals, the elderly have higher rates of conversion to open cholecystectomy, somewhat longer postoperative hospital stays, and more complications. It has been well established that when compared with younger groups, the elderly are more likely to be converted to open cholecystectomy<sup>27,29</sup>. In unselected studies, the age of  $\geq 65$  years has been a consistent risk factor for conversion independent of other variables<sup>26,32</sup>. In a review<sup>24</sup> of nine studies involving 1,432 LCs in elderly patients<sup>9,22,23,25,27,17,28,29,31,20</sup>, conversion rates ranged from 1% to 35% (average, 8.6%). In our study, the rate of conversion to open cholecystectomy in age  $\geq 65$  years was 13.15% and  $< 65$  was 5.08%. We believed that increasing confidence and experience in the techniques of laparoscopic dissection are likely to have contributed to the low conversion.

The average operation time was of 45 minutes and 50 minutes in  $< 65$  years and  $\geq 65$  year respectively in this study, which was comparable to the most recent publications<sup>33-35</sup>. One should be advised, however, to avoid hasty maneuvers due to increased risk of iatrogenic lesions. On the other hand, the delay in conclusion of LC can be a risk factor for postoperative complications<sup>36</sup>. The important thing is that the operation must be performed safely, effectively and in a timely manner.

Average hospital stay in this study was 4 days (range: 3 to 11) in both age groups. The longer hospital stay is primarily seen in patients who were operated for complicated gallstone disease. There was no significant difference between age groups. Hospital stay found in our study was comparable to other studies. There are reports of "day-care" hospitalization (4 to 6 hours)<sup>37</sup> but we are not practicing day care hospitalization in our institute till date.

## CONCLUSION

Despite underlying co morbidities we believe that Laparoscopic cholecystectomy is feasible and safe in elderly patients. Age alone should not be the contraindication for laparoscopic cholecystectomy.

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# Study of Percutaneous Kirschner Wire Fixation and Plaster Cast Application for Unstable Distal Radius Fracture in Adult Patients

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## Key words:

Colles fracture, Kirschner wires, Close reduction

## ABSTRACT

**Objective:** Percutaneous Kirschner wire fixation and plaster cast application for unstable distal radius fracture in adults has acceptable results.

**Methods:** It was a hospital based prospective study of eight months (15 May 2009 to 15 January 2010) duration conducted at Gandaki Medical College, Charak Hospital, Pokhara, Nepal. Forty patients, 30 females and 10 males with unstable distal radius fracture managed by close reduction and percutaneous pinning were followed and evaluated radiologically and clinically.

**Results:** All thirty five patients (5 dropped out) in the series had less than a 10-degree difference between the radial angle at initial reduction and that at final healing. Twenty-seven patients had less than a 10-degree change in the palmer tilt as well. The clinical result in twenty-six patients was graded as excellent, meaning that there was no pain, functional impairment or deformity and that the range of motion of the wrist was at least 90 percent of that on the contra lateral side. The result was considered to be satisfactory in six patients who had mild functional impairment or pain, or 80 to 90 per cent of normal motion in the wrist. The result was rated as unsatisfactory in three patients who had significant functional impairment and pain but no deformity.

**Conclusions:** Simple percutaneous fixation by two Kirschner wires can successfully maintain reduction in most displaced Colles fractures, with a very low incidence of complications and unsatisfactory results.

## INTRODUCTION

Distal radius fractures are among the most common fracture of the upper extremity.<sup>1</sup> The degree of disability after a Colles fracture has been shown to correlate with the amount of residual deformity.<sup>2</sup> Methods that reduce residual deformity by maintaining the reduction with additional fixation include

the use of Rush rods<sup>3</sup>, percutaneous Kirschner wires<sup>4</sup>, pins-in-plaster technique<sup>5</sup> and external fixation. Operative reduction and internal fixation, although recommended by some<sup>6</sup>, has not been generally accepted due to its technical difficulty and the often poor quality of bone in older patients. This study was carried out to find out the functional and radiological outcome of unstable Colles' fracture treated by percutaneous cross K wires and short arm cast application.

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## METHODS

This was a prospective, observational study carried out over eight months (15 May 2009 to 15 January 2010) at Gandaki

Medical college-Charak Hospital, Pokhara, Nepal. Unstable Colles fracture presented within one week of trauma in patient 18 years to 70 years of age were included in this study. Undisplaced and stable Colles fractures, Volar displaced fracture and other fractures of the wrist with more than two articular fragments were excluded from the study.

Total number of patients was fourty. Thirty were female and 10 were male. Age ranges from 20 -68 years with mean age 53. The fracture patterns were grouped according to the classifications of Frykman. All procedures were done in the operating room using either regional or general anesthesia under image intensifier. Close reduction was done by Charnley's reduction technique. The reduction was then evaluated in the anteroposterior and lateral planes with the Image intensifier. Once the length, the dorsal and radial angles, and the joint surface of the radius have been restored, the fracture was fixed by two 1.5 mm smooth Kirschner wires, inserted percutaneously with a power drill.

The first Kirschner wire is inserted at the tip of the radial styloid process just dorsal to the first extensor canal, in the anatomical snuff box proximal to the radial artery. aiming to cross the fracture line in both planes under image- intensifier control. This requires about a 45-degree angle with the long axis of the radius on the posteroanterior view and aiming the wire 10 degrees dorsally on the lateral view. The second Kirschner wire is inserted into the dorsal ulnar corner of the distal part of the radius between the fourth and fifth extensor canals. The correct line of aim that is required to cross the fracture is about 45 degrees on the posteroanterior view and 30 degrees volarward on the lateral view (Figs. 1-A and 1-B).

Both Kirschner wires were advanced just to penetrate the cortex of the proximal fragment. The accuracy of the reduction and of the placement of the Kirschner wires was again assessed with the c-arm recorder. (Fig 2 A,B)



Figure 1 –A, B



Figure2-A,B

Stability was checked by gentle wrist flexion and extension. Short arm cast was applied and observed for one day. Postoperatively follow up was done at 1 week, 6 weeks and in 3 months interval. At six weeks the cast was removed, radiographs were made, Kirschner wires were removed and active and passive motion of the wrist was begun.

Radiographic evaluations was done on true AP and lateral radiograph taken immediately after operation and at 3 months follow up by measuring palmer and radial angle. The method presented by van der Linden and Ericson was used in this study. The dorsal angle is the angle on the lateral radiograph between a line perpendicular to the long axis of the radius and a line parallel to the joint surface, indicated by joining the volar and dorsal margins of that surface. A positive angle is inclined dorsally and a negative angle is inclined volarward. The radial angle is the angle on the posteroanterior radiograph between a line perpendicular to the longitudinal axis of the radius and a line parallel to the articular surface, indicated by joining the radial and ulnar margins of that surface. The accuracy of these angles is somewhat variable, depending on the angle of the x-ray beam and the subjective interpretation of the measurer. However, they are the best available objective means of determining the anatomical alignment of the distal part of the radius. Measurements were found to vary by as much as 5 degrees on the same radiograph with the same examiner. Therefore, changes of less than 5 degrees were not considered significant. As it was too expensive to make routine radiographs of the contralateral wrist for comparison, the measurements of the dorsal/ palmer tilt and radial angles on the radiographs made at three month were compared with those obtained at the time of reduction.

Clinical Evaluation was done by subjective and objective assessment at three month after fracture. The subjective assessment consisted of the patient's perceptions of whether or not the wrist performed normally, appeared normal, and was free of pain. The objective assessment consisted of determination of the presence or absence of deformity and measurement of flexion and extension of the wrist and pronation and supination of the forearm. The ranges of flexion-extension of the injured wrist and of pronation-supinaion of the injured forearm were compared with those of the uninjured side and were recorded as a percentage of the normal range of motion for each patient.

## RESULTS

Total 40 patients, 30 female and 10 male were involved in this study. Thirty five patients were available for three months of follow up.

Table I:

### Distribution of colles fracture According to Frykman classification

Fracture type	No . Of paients	Percentage
I — Extra-articular. ulna intact	10	25
II — Extra-articular. fractured ulna	8	20
III — Intra-articular radiocarpal	6	15
IV — Intra-articular radiocarpal. fractured ulna	5	12.5
V — Intra.articular radio-ulnar	2	5
VI — Intra-articular radio-ulnar. fractured ulna	2	5
VII — Intra-articular radiocarpal and radio-ulnar	2	5
VIII- Intra-articular radiocarpal and radio-ulnar , fractured ulna	5	12.5

The alignment shown on the radiographs made at the time of reduction was palmer tilt averaged 8 degrees (range: 16 degree palmer tilt to -5degrees dorsal tilt) and the radial angle averaged 18 degrees (range. 10 to 27 degrees) as shown in table II.

**Table II**  
Comparison of the alignment immediately after reduction with that at final follow up

Fracture Type	Average Palmar Tilt (Degrees)			Average Radial Angle(Degrees)		
	Post op	Final	change	Post op	Final	change
Frykman						
I	7	10	3	19	18	-1
II	8	4	-4	17	19	2
III	9	5	-4	16	12	-4
IV	6	8	2	18	16	-2
V	5	6	1	17	18	-1
VI	10	10	0	21	23	2
VII	6	9	3	23	22	-1
VIII	4	0	-4	20	18	-2
Total	6.8	6.5	-0.3	18.87	18.25	-0.62

All thirty five patients in the series had less than a 10-degree difference between the radial angle at initial reduction and that at final healing. Twenty-seven patients had less than a 10-degree change in the palmer tilt as well.

The normal range of motion of the uninjured wrist varied considerably in thirty five patients, with flexion averaging 80 degrees (range, 50 to 110 degrees); extension, 75 degrees (range, 45 to 90 degrees); pronation, 85 degrees (range, 70 to 100 degrees); and supination, 85 degrees (range, 80 to 115 degrees). Therefore, the ranges of flexion-extension of the injured wrist and of pronation-supination of the injured forearm were compared with those of the uninjured side and were recorded as a percentage of the normal range of motion for each patient.

**Table III**  
Average final range of motion (percent of normal)

Fracture Type	Flexion.Extension	Rotation
Ftykman		
I	98	98
II	97	100
III	90	98
IV	95	98
V	90	94
VI	85	100
VII	97	97
VIII	84	99
Total	92	98

The clinical result in twenty-six patients was graded as excellent, meaning that there was no pain, functional impairment or deformity and that the range of motion of the wrist was at least 90 per cent of that on the contra lateral side. The result was considered to be satisfactory in six patients who had mild functional impairment or pain, or 80 to 90 per cent of normal motion in the wrist. The result was rated as unsatisfactory in three patients who had significant functional impairment and pain, but no deformity. They had about 85 percent of normal rotation in the forearm but only 50 per cent of normal flexion

and extension in the wrist. The pattern of the fracture in these patient were Frykman type VI, VII and VIII.

Regarding the complication, one patient had feature suggestive of sympathetic dystrophy. In two patients a radial pin migrated proximally and required a two centimeter incision over the dorsal aspect of the forearm for exposure and removal in the operating room at six week. Reduction was lost in one of these patients and resulted in a 20-degree dorsal angulation (a 22-degree change) and an occasional ache in the wrist, but the patient had normal function.

## DISCUSSION

Orthopaedic advances over the past decades have resulted in the concept that the results after a fracture can be improved by maintaining anatomical reduction. The Colles fracture should not be an exception. Earlier reports in the literature have suggested that satisfactory function can be obtained despite poor anatomical alignment of a Colles fracture<sup>7</sup>, but other studies have shown that the standard cast treatment of this injury is associated with a substantial rate of complications<sup>2,8</sup>. There appears to be a distinct parallel between anatomical and functional results<sup>8,9</sup>. Complications directly related to malunion include osteoarthritis, tendon rupture by attrition, weak grip, and secondary mid-carpal collapse<sup>8,10</sup>.

The alignment shown on the radiographs made at the time of reduction was judged to be anatomical in all patients with palmer tilt averaged 8 degrees (range: 16 degree palmer tilt to -5degrees dorsal tilt) and the radial angle averaged 18 degrees (range. 10 to 27 degrees). This compares favorably with the previously reported normal values of about 10 degrees (range. 21 to — 1 degree) for the dorsal angle and about 20 degrees (range. 13 to 30 degrees) for the radial angle<sup>11</sup>.

The over-all good results in this series suggest that maintenance of an anatomical reduction is a more important factor than the fracture pattern in determining the final result. All patients achieved satisfactory rotation of the forearm regardless of the degree of involvement of the radioulnar joint. However, the two patients with an unsatisfactory anatomical result and the one with an unsatisfactory clinical result all had a fracture involving the intra-articular surface of the radiocarpal joint. Poorer results have been demonstrated in Frykman types IV through VIII.

Reducing a Colles fracture is not a problem, but maintaining the reduction certainly is. Various types of casts and positions have been recommended, but none have been uniformly accepted<sup>10</sup>. Neuropathies, ischemic complications, and stiffness are most often related to the type and position of cast immobilization. Additional fixation offers the advantage of maintaining the reduction while allowing the fingers to remain functional.

## CONCLUSION

The results in the present series demonstrate that simple

percutaneous fixation by two Kirschner wires can successfully maintain reduction in most displaced Colles fractures, with a very low incidence of complications and unsatisfactory results. This represents a significant improvement over the 30 percent rate of complications reported in other series, in which the fractures were treated by closed reduction and cast application alone. With Kirschner-wire fixation, the reduction can be maintained with the wrist in neutral to allow full motion of the fingers. Also, if the splint must be spread to allow for swelling, the reduction is not lost. The advantage of this method over the use of an external fixator is that there is no risk of pin-track infection and no bulky apparatus.

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# Occurrence of Chronic Obstructive Pulmonary Disease in Patients with Squamous Cell Carcinoma of Head and Neck Regions: A Prospective Study

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## ABSTRACT

### Key words:

COPD

GOLD

Squamous cell carcinoma

**Objectives-** To investigate the occurrence of chronic obstructive pulmonary disease (COPD) based on recent criteria defined by the Global Initiative for the chronic obstructive lung disease (GOLD) in patients with squamous cell carcinoma of head and neck regions.

**Method-** A prospective study of 30 patients, comprising of 23 males and 7 females with age ranging from 40 – 88years, having squamous cell carcinoma of the head and neck regions were subjected to computerized spirometry, arterial blood gas analysis, chest x-ray and routine blood investigations, over a period of 1 year to detect the occurrence of chronic obstructive pulmonary disease in cancer patients.

**Result** -70 % of the cancer patients had COPD at the time of cancer diagnosis. In age more than 45 years, based on GOLD criteria and blood gas analysis, 81 % of patients had mild COPD, 14.3% had moderate COPD and 4.8% had severe COPD. The absolutely dominating factors were increasing age and smoking. All the patients were smokers.

**Conclusion-** In patients with squamous cell carcinoma of head and neck regions, COPD is more likely to occur in those patients who chronically smoke more than 20 cigarettes per day.

## INTRODUCTION

As age advances, the number of people who suffer from more than one chronic disease is increasing. Recent analyses of Eindhoven Cancer Registry data on co-morbidity at the time of diagnosis of cancer showed that about 60% of all new cancer patients older than 65 years suffered from at least one other serious disease.<sup>1</sup> Chronic obstructive pulmonary diseases (COPD) appeared to be one of the most common

(17%) conditions in these newly diagnosed cancer patients.<sup>1</sup> COPD was the sixth leading cause of death in the world in 1990 responsible for 42 million or 4% of deaths. By 2020, the mortality is expected to increase to 4.5 million, or 7% of all deaths, and COPD is expected to rise to third position, after only ischemic heart disease and cardiovascular disease<sup>2</sup>

Oral cancer is the 11th most common cancer in the world in term of number of cases. Worldwide, about 389,000 new cases occurred in 2,000, two thirds of which were in developing countries, and these cancers are responsible for some 200,000 deaths each year.<sup>3</sup> It is estimated that 80% of patients seen for COPD have significant exposure to tobacco smoke. The remaining 20% frequently have a combination of exposures to environmental tobacco smoke, occupational dusts and

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chemicals, and indoor air pollution from biomass fuel used for cooking and heating in poorly ventilated buildings. Outdoor air pollution, airway infection, familial factors, and allergy have also been implicated in chronic bronchitis, and hereditary factors (deficiency of alpha 1 antiprotease) have been implicated in COPD.<sup>4</sup> Smoking is estimated to be responsible for about 41% of laryngeal and oral / pharyngeal cancers in men , and 15% of women worldwide and these proportions vary among different populations.<sup>3</sup> Since smoking is an important risk factor for both COPD, head & neck cancer an increased incidence of COPD can be expected among patients with head & neck cancer.

**METHODS**

This study was conducted during August, 2008 to August, 2009 in Kasturba Medical College, Mangalore, India with a sample size of 30. All the patients diagnosed with squamous cell carcinoma of head and neck regions based on the biopsy, without history of previous surgery of head and neck cancer, with history of tobacco consumption and without history of radiotherapy were included in study. Patients who were non smokers and previously diagnosed respiratory disease like bronchial asthma, pulmonary tuberculosis, bronchiectasis, cor-pulmonale in failure, cardiac illness were excluded from study.

The study protocol was submitted, examined and approved by the Institutional Ethics committee of MCOADS Mangalore. In every case thus selected, a detailed history was taken giving special emphasis to symptoms of COPD. Details about smoking was recorded in the number of pack years (1pack yr= 20 cigarette/day x 1yr). Enquiry was made regarding the occupational exposure to smoke, history of recurrent respiratory tract infection and family history. Patients unable to perform the pulmonary function inefficiently (due to large tumor size, local fibrosis, and trismus) were then considered for arterial blood gas analysis. For spirometry study, computerized spirometry was used. This spirometry gives age, sex, race, weight and height matched preselected expected and patients present values. Fifteen parameters were available in graphic recording. Among those, forced expiratory volume in first second (FEV1) and ratio of forced expiratory volume in first second to forced vital capacity (FEV1/FVC ratio) were analyzed. The best value from the three attempts was selected. FEV1% prediction was used to assess the disease severity. Arterial blood gas analysis was done immediately after collection of blood from radial artery with pre heparin rinsed syringe. Data were analysed using SPSS 11.5 software.

**GOLD CLASSIFICATION OF COPD disease severity:** GOLD stages were defined as follows:

Stage I (mild): FEV1/forced vital capacity (FVC) <70% and FEV1>80% predicted. With or without chronic symptoms (cough, sputum production).

Stage II (moderate): FEV1/FVC<70% and FEV1<80% predicted and >50% predicted. With or without chronic symptoms (cough, sputum production).

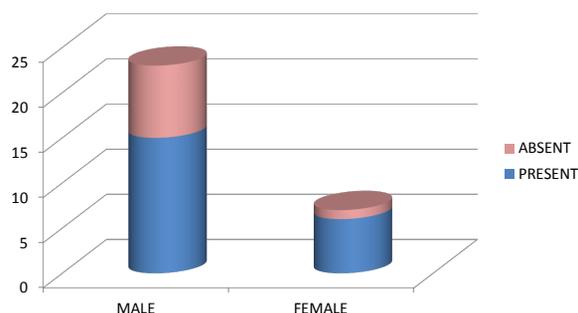
Stage III (severe): FEV1/FVC<70% and FEV1<50% predicted and >30% predicted. With or without chronic symptoms (cough, sputum production).

Stage IV (very severe): FEV1/FVC<70% and FEV1<30% predicted or FEV1<50% predicted plus chronic respiratory failure (PaO2<8.0 kPa with or without PaCO2>6.7 kPa while breathing air at sea level).<sup>5</sup>

**RESULTS**

There were total of 30 patients of which 23 were male and 7 were female with age ranging from 40-88 years with a mean age of 57.57 ± 11.36 years.

**Graph 1: Gender VS COPD**



**Occurrence:** Majority of the patients i.e. out of 30 patients 21 (70%) patients were diagnosed as COPD and the remaining 9 patients (30%) had normal lung function.

Table 1: Showing the presence of COPD

COPD	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	21	70.0	70.0	70.0
No	9	30.0	30.0	100.0
Total	30	100.0	100.0	

**Severity of COPD:**

Out of 21 cases of COPD, 17 patients i.e. 81 % of patients were diagnosed as mild, 3 i.e 14.3% were diagnosed as moderate and 1 i.e. 4.8% patient was diagnosed as severe COPD based on the grading system of GOLD classification and arterial blood gas analysis.

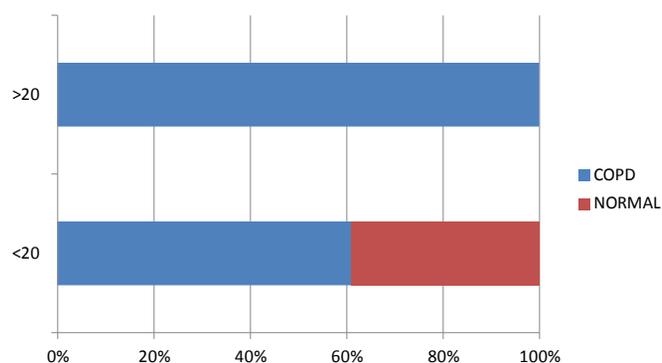
Table 2: Distribution of severity of COPD

Severity of COPD	Frequency	Percent	Valid Percent	Cumulative Percent
mild	17	81.0	81.0	81.0
moderate	3	14.3	14.3	95.2
severe	1	4.8	4.8	100.0
Total	21	100.0	100.0	

### Correlation between the pack year and COPD

Those patients who used to smoke more than 20 cigarettes per day were 7 in number and all those 7 patients were diagnosed as COPD. Patients who used to smoke less than 20 cigarettes per day were 23 in number and out of which 14 patients i.e. 60.9% were diagnosed as COPD and 9 i.e. 39.1% patients were having normal lung function. Statistically, there was a significant association between pack year and COPD. ( $p < 0.048$ )

Graph 2: Occurrence of COPD and Packed Year



## DISCUSSION

Oral pharyngeal cancer, like most other cancer, affects the individual in higher age groups and most of patient being over age of 40. Although oral cancer most commonly occurs in middle-aged and older individuals, a disturbing number of these malignancies are also being documented in younger adults in recent years<sup>6</sup>. A case-control study estimated that the risk of developing oral cancer was approximately 50-fold greater in heavy smokers and drinkers than those who never smoked and never drank.<sup>7</sup> All forms of tobacco increase a person's risk of oral cancer. In fact, smokers are six times more likely to get an oral cancer than nonsmokers. Heavy, regular alcohol consumption is a risk factor for oral cancer. It's estimated that 75 to 80 percent of those with oral cancer drink alcohol frequently. Like smokers, people who drink a lot of alcohol on a regular basis are also six times more likely to get an oral cancer than nondrinkers. Approximately 90 percent of those diagnosed with oral cancer or pharyngeal cancer (including

cancer of the mouth, tongue, lips, throat, parts for the nose, and larynx) are tobacco users. It appears that men contract oral cancer at twice the rate of women, due to the fact that they are more likely to smoke and drink heavily for longer periods of time than females. After the age of 40, the risk of oral cancer increases, with 60 being the average age of diagnosis.<sup>8</sup>

The primary risk factor for head and neck cancer is smoking, a shared risk factor with COPD.

A lifetime smoker is at high risk of developing a range of potentially lethal diseases, including:

- 1) Cancer of the lung, mouth, nose, vocal cord, tongue, nasal sinus, esophagus, throat, pancreas, bone marrow (myeloid leukemia), kidney, cervix, urethra, liver, bladder and stomach
- 2) Lung diseases such as chronic obstructive pulmonary disease, which includes chronic bronchitis and emphysema.
- 3) Coronary artery disease, heart disease, heart attack and stroke.
- 4) Ulcers of the digestive system.

The effects of tobacco smoke on the respiratory system include:

- 1) Irritation of the trachea and larynx.
- 2) Reduced lung function and breathlessness due to swelling and narrowing of the lung airways and excess mucus in the lung passages
- 3) Impairment of the lungs' clearance system, leading to the build-up of poisonous substances, which results in lung irritation and damage
- 4) Increased risk of lung infection and symptoms such as coughing and wheezing
- 5) Permanent damage to the air sacs of the lungs

Inflammation occurs in the peripheral airways of all smokers, even before COPD is established, and is made up of inflammatory cell infiltrate in the airway wall consisting of mononuclear cells and clusters of macrophages in the respiratory bronchioles. These lesions occur initially in the absence of any significant tissue destruction or fibrosis, and may be reversible. A similar inflammatory process with T lymphocytes and macrophages has been described in the large air ways of smokers. Evidence indicates that acute cigarette smoke exposure can result in tissue damage, with degradation of products of external matrix proteins and lipid per oxidation products. In contrast to the inflammatory effects of chronic cigarette smoking, acute cigarette smoking in general has a suppressive effect on cells and inflammatory cytokines. These early inflammatory changes in the air way are likely to represent a nonspecific innate immune response to airway injury from tobacco smoke.<sup>9</sup>

Patients with a history of pulmonary disease have a higher incidence of preoperative complications, such as atelectasis,

pneumonia and respiratory failure. A preoperative evaluation is important to determine the risk for these complications and to modify the patients pulmonary function to decrease the likelihood of their development. The information elicited also helps create a post operative treatment plan to avert possible complications. No studies are available that can precisely target those patients who will have complications. Instead patients are placed in high risk categories based on history, physical examination, pulmonary function tests, and the nature of surgery to be performed.<sup>10</sup> The single best predictor of postoperative pulmonary complications is a preoperative abnormal pulmonary function test. Other indicators include obesity, smoking and age greater than 60 years. A high risk for pulmonary morbidity may be indicated by forced expiratory volume in one sec (FEV1) of less than 2.0 L, a maximal breathing capacity less 50% than predicted, or an arterial carbon dioxide (CO<sub>2</sub>) tension of greater than 45 mm Hg.<sup>10</sup>

Tobacco smoking is listed as the most common causes of COPD from almost all over the world. Although smoking amongst women is common in a few areas, it is negligible at the national level and unlikely to significantly contribute the total COPD burden. It is the exposure to biomass fuel combustion which is more important in women<sup>11</sup>. Study by Carlos .A Jimenez- Ruiz et al has shown that smokers with COPD have higher tobacco consumption, higher dependence on nicotine and higher concentration of CO in exhaled air .Cases of COPD predominate in men and individuals with lower educational level. Carlos et al study showed a significant association of male sex, age >46 years, low educational level and the consumption of >30 pack years of tobacco with diagnosis of COPD in smokers<sup>12</sup>. Present study also showed a predilection for male sex. Mean age of the patients was 57.57 years with a standard deviation of 11.367 years. According to Anne Lindberg et al the prevalence of COPD was strongly smoking dependent and increased considerably with increasing age. The prevalence of COPD increased almost linear from the age of 47 years in smokers, while in non-smokers the increase started after the age of 62 years. The distribution of the disease severity among the subjects with COPD according to the BTS criteria was: 65% mild disease, 27% moderate, and 8%severe disease. The corresponding distribution of COPD according to the GOLD criteria was: 57% mild 37% moderate, 5% severe, and 1% very severe disease.<sup>13</sup> In our study the distribution of the disease severity among the subjects with COPD according to the GOLD criteria and arterial blood gas analysis was: 81% mild disease, 14.3% moderate ,and 4.3% severe disease. The major findings of this study are that increasing age and smoking are the two dominating risk factors for COPD. Close to 90% of men with COPD were smokers or ex-smokers and age is an important risk factor, but also other risk factors as the total amount of airborne exposure contributes to COPD. However, smoking can almost be regarded as a necessary risk factor for

COPD, especially among subjects with severe COPD.<sup>13</sup> In our study 71.4% of men with COPD were smokers.

According to S.A.M van de Schans the prevalence of COPD was higher at older (65+) than at middle age (53-65) (15% versus 7.4%) and higher among males as compared to females (15 % versus 7.6%). A relatively higher prevalence of COPD was found among patients with lung cancer, middle aged male and female patients with esophageal cancer. The prevalence of COPD was significantly higher for squamous cell carcinoma compared to adenocarcinoma.<sup>14</sup> In our study COPD was higher among males and the mean age 57.57 years with a standard deviation of 11.367 years. All the patients in our study are oral cancers and all of them were diagnosed histopathologically as squamous cell carcinoma. In our study a higher incidence of COPD was found in patients with head and neck cancers patients. Smoking is the predominant common risk factor for both COPD and oral cancer and also to esophageal, laryngeal and renal cancer.

The presence of chronic obstructive pulmonary disease (COPD) is the most important patient related risk factor for developing pulmonary complications postoperatively. A patient with COPD has a 6% to 28% risk of developing pulmonary complications, depending on the severity of airflow obstruction which cannot be stratified more precisely than 'high, 'moderate' or "low." Smoking is a significant risk factor. Smokers have a 1.4- to 4.3-fold greater risk of pulmonary complications than do patients who have never smoked.<sup>15</sup>

## CONCLUSION

Conclusion- In patients with squamous cell carcinoma of head and neck regions, COPD is more likely to occur in those patients who chronically smoke more than 20 cigarettes per day.

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# Cytological Evaluation of the Enlarged Neck Lymph Nodes in Patients attending ENT OPD at Gandaki Medical College

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## Key words:

Neck Lymph Nodes,  
Lymphadenitis, Neoplasms

## ABSTRACT

**Objective:** To determine the pattern of disease affecting lymph nodes of head and neck.

**Methods:** This was a descriptive study carried out in ENT and Pathology departments of Gandaki Medical College, Nepal from January 2010 till 2011 December. Patients of all age and either sex presenting with palpable lymph nodes of head and neck region in our institute were recruited in the study. The patients with same but bearing contraindication for FNAC were excluded. FNAC of total of 126 consecutive cases of lymph nodes were done. All the FNAC and cytopathological diagnosis was conducted by the pathologist.

**Result:** Out of 126 patients male were 67 (53.17%) and female were 59 (46.83%). Male to female ratio of the patients was 1:0.88 and the age ranged from 1-86 years with a mean age of 24.93±20 years. Cervical lymph nodes were most commonly involved 93 (74%). FNAC diagnosis was found to be as follows: reactive lymphadenitis (61.9%), necrotizing granulomatous lymphadenitis consistent with tuberculosis (15.1%), granulomatous lymphadenitis suggestive of tuberculosis (12.7%), metastatic carcinoma to lymph nodes (5.6%), non Hodgkin's lymphoma (4.0%) and lymphangioma (0.8%).

**Conclusion:** Reactive lymphadenitis was the commonest problem in patients presenting with enlarged neck lymph nodes in our set-up, followed by tuberculous lymphadenitis and malignant neoplasms.

## INTRODUCTION

Neck masses often pose a challenging diagnostic problem for the clinicians as diagnosis by purely clinical criteria is often unremarkable. Clinical examination and often diagnostic aids like radiology and blood tests fail to resolve the vexing problem regarding the nature of mass. Fine Needle Aspiration Cytology (FNAC) is a procedure whereby a small amount of tissue or cells is aspirated from a pathological lesion with the

help of fine 10ml disposable syringe of 18 or 23 gauge needles. Lymph node aspiration is of great value for the diagnosis of lymphadenitis, lymphomas and metastatic Carcinoma<sup>1,2</sup>. Its sensitivity and specificity of FNAC have been documented by several studies in the past.<sup>3,4</sup> Virtually any superficial organ or tissue can be sampled through this procedure. This procedure was first done by Griey and Gray in 1904, in patients with sleeping sickness<sup>5</sup>.

The experiment of fine needle aspiration (FNA) developed gradually, until 1921, when Guthrie tried to correlate FNA results with various disease process<sup>6</sup>. The main benefit of FNAC is to avoid the need for surgical biopsy, which requires local or general anesthesia, increased hospital stay and costs<sup>7</sup>. Nepal is a high-burden country for TB. About 45% of the total

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population is infected with TB and an estimated 20,000 new infectious cases of TB are reported each year<sup>8</sup>. Tubercular lymphadenopathy is the most common extra pulmonary form of tuberculosis and cervical lymph nodes are the most commonly affected group of nodes<sup>9</sup>. The purpose of this study was to determine the pattern of disease affecting neck lymph nodes.

**METHODS**

This was a descriptive study conducted at ENT and Pathology departments of Gandaki Medical College to determine the pattern of disease affecting the lymph nodes of the neck. The duration of study was from January 2010 to December 2011.

Patients of all age and of either sex presenting with palpable lymph nodes of head and neck region in our institute were recruited in the study. The patients with palpable lymph nodes and having a contraindication of the FNAC (Bleeding disorders, Cardio respiratory failure) were excluded from the study. All patients were asked detailed history pertaining to neck swelling and relevant questions to the etiological factors. Apparatus used included 10 ml disposable plastic syringe 22–25 gauge, 0.6–1.0 mm external diameter disposable needle 3.98 cm and 8.8 cm long with or without stylet, antiseptic sponges, sterile gauze pads, microscopic glass slides.

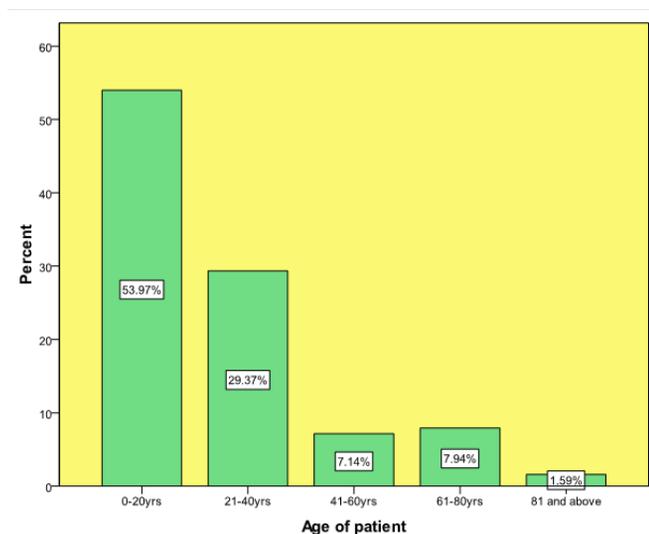
All FNAC were carried out by the pathologists. A 23-gauge needle was connected to a 10-ml syringe mounted on a syringe holder. The palpable cervical node was fixed with one hand and a needle was inserted into the lymph node and a full suction pressure was applied. The tip of the needle was moved around at varying angles and depths and with constant negative pressure (never emerging outside the skin). Before final withdrawal, the negative pressure was released prior to the needle emerging from the skin. The cytological material was transferred onto glass slides. The aspirated material then smeared on 2-4 slides, fixed in 95% ethanol and stained by Papanicolaou and May-Grunwald Giemsa stains and was evaluated by the pathologist for cytology.

The data analysis was performed using SPSS version 17.

**RESULT**

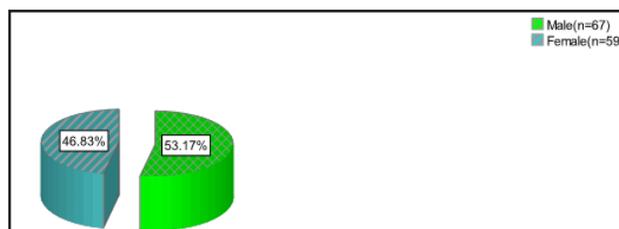
In this study 126 patients were involved. Among them male were 67 (53.17%) and female 59 (46.83%). Mean age was 24.93 years and (SD±20. 0). Age ranged from 1 year to 86 years. The age distribution of the study population is shown in Figure 1.

Graph 1: Age distribution of the subjects



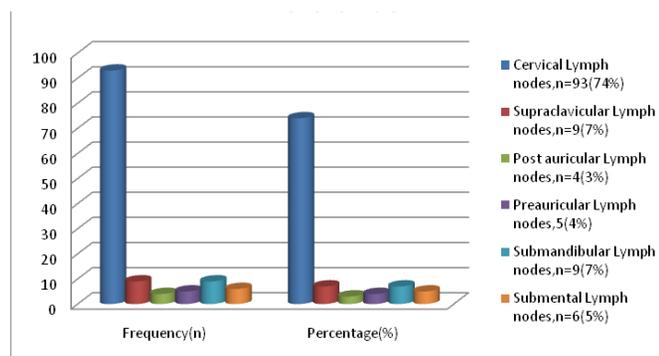
Patient with age group 0-20; 21-40; 41–60 and 61–80 and above 80 years were 53.97% ; 29.37% ; 7.14% ; 7.94% and 1.59% respectively. Most of the patients were between the age 0-20 years.

Pie-chart 1: Sex distribution of the subjects



Male were higher in frequency ( n=67 ; 53.17% ) than female ( n=59 ; 46.83% ).

Graph 2 : Site of FNAC of cervical lymph nodes (n=126)



FNAC was done from various sites from the neck. Cervical lymph nodes were the most common site 93 (74%) involved then supraclavicular lymph nodes 9 (7%), submandibular lymph nodes 9 (7%), sub mental lymph nodes 6 (5%), preauricular lymph nodes 5 (4%) and post auricular lymph nodes 4 (3%).

Table 1 : Result of FNAC of lymph nodes

Diagnosis	Frequency	Percent
Reactive Lymphadenitis	78	61.9
Necrotizing Granulomatous Lymphadenitis consistent with Tuberculosis	19	15.1
Granulomatous Lymphadenitis suggestive of Tuberculosis	16	12.7
Non Hodgkin's Lymphoma	5	4.0
Metastatic Carcinoma to Lymph nodes	7	5.6
Lymphangioma	1	.8
Total	126	100.0

Reactive lymphadenitis was the most common diagnosis 78 (61.9%) followed by necrotizing granulomatous lymphadenitis consistent of tuberculosis 19 (15.1%), granulomatous lymphadenitis suggestive of tuberculosis 16 (12.7%), non Hodgkin's lymphoma 5 (4.0%), metastatic carcinoma to lymph nodes 7 (5.6%), lymphangioma 1 (0.8%).

## DISCUSSION

This study was carried out to find out the relative frequencies of various pathologies presenting as enlarged lymph nodes in the neck in the ENT OPD. Diagnostic FNAC when performed by pathologist offers a high degree of reliability and feasibility, therefore FNAC has gained universal acceptance as in most instances. The technique is safe simple and quick with a low complication rate and helps to select people preoperatively for surgery<sup>10</sup>. The FNA for cytological evaluation of neck masses was first reported by KUM in 1947<sup>11</sup>. Nowadays this technique is becoming popular all over the world in the diagnosis of masses of head and neck region as no sophisticated equipments are required.

In the present study, the age of patients ranged from 1 to 86 years with a mean of 24.93±20 years. Male were 67 (53.17%) and female were 59 (46.83%) with male to female ratio of 1:0.88. This age range and mean incidence is similar to the study by Shakya G et al<sup>12</sup>. We found that the majority of patient in our study (59.97%) was from 0-20 years age which was similar to study done by Zaatar R et al<sup>13</sup> an in the study by Mazhar Iqbal<sup>14</sup> it was 13 to 40 years. The second commonest age group affected in this study (29.37%) was from 21-40 years while in the study by Shakya G, age group from 21-40 years was the most common<sup>12</sup>. Cervical lymph nodes were mostly affected (74%) in our study which was consistent with the study by Zaatar R et al<sup>13</sup>, Egea et al (67.5%)<sup>16</sup> and S. Shamshad Ahmad et al (73%)<sup>17</sup>. In the present series, more than half of

the cases (61.9%) were that of reactive lymphadenitis which was similar to the study done by Mohammad R and Azadeh R<sup>15</sup> in which 58.9% of the lesions were reactive lymphadenitis. Most cases in the cervical region may be of acute lymphadenitis due to infections of the oral cavity, nose and ear. Alwan et al. and Narang et al also showed reactive lymphadenitis in 55.3% and 61.6% of the lymph nodes, respectively<sup>18,19</sup>. Necrotising Granulomatous Lymphadenitis, consistent with Tuberculosis (15.1%) was second most common pathology and granulomatous lymphadenitis, suggestive of tuberculosis were seen in 12.7% of cases in our study. The incidence of tuberculous cervical lymphadenopathy in Ruchi Khajuria's<sup>21</sup> study at Jammu was 52% while that of Mazhar Iqbal's<sup>14</sup> study showed 70%. These findings were much higher than our study.

Non-Hodgkin's Lymphoma was seen in 7 (5.6%) cases. Similar finding was shown in a study by Haque MA consisting of 6 cases (5.6%)<sup>20</sup>. In the study by Ruchi Khajuria<sup>21</sup> incidence of lymphoma was 2% only. Metastatic carcinoma to lymph nodes was found in 5.6% cases in our study which was much lesser than the study by Mazhar Iqbal (11.36%)<sup>14</sup>. In another large study, nasopharyngeal carcinoma was reported as a most frequent metastatic disease to cervical lymphnode<sup>22</sup>.

## CONCLUSION

The present study has reported the pattern of cytological diagnosis on FNAC of enlarged lymph nodes of the head and neck region among the Nepalese population in the western region. It is concluded that reactive lymphadenitis is the commonest problem in patients presenting with neck swellings in our set-up, followed by tuberculous lymphadenitis and malignant neoplasms. Despite the limitations, FNAC provides a reliable and convenient method for the initial management of cervical lymphadenopathy. We believe this information would be useful in many clinical settings and facilitate pathology reporting and focused clinical investigation under the current Nepalese perspective.

## CONFLICTS OF INTEREST

The authors declare that they have no competing interests.

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# Treatment Outcome of Unstable Fractures of Radius & Ulna in Children by Pin Fixation: A Prospective Study at GMC

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## Key words:

Children,  
Unstable Fracture,  
Percutaneous,  
Open intramedullary fixation

## ABSTRACT

**Objective:** To find out the functional outcome of k-wire fixation of unstable radius and ulna fractures in children.

**Methodology:** It was a prospective study done from 14th April 2010 to 13th April 2011 at the department of orthopedics at Gandaki Medical College, Pokhara. All unstable fractures of radius & ulna of children from 1 to 16 years of age were included in the study. Patients younger than 1 year & older than 16 years, cases of polytrauma and open fractures were excluded from the study. Under intravenous short acting anesthesia acceptable reduction was achieved and held with per cutaneous or open k-wire fixation of the fractures supplemented with external plaster cast immobilization. Monthly follow up of the patients was done for minimum of six months. Patients were assessed radiologically and functionally and results were graded according to Price et al criteria.

**Result:** Total of 90 cases was enrolled in this study period. Out of that 3 cases didn't comply with the full follow up protocol. Final result was recorded from 87 patients only. The age range was 3-16 years. 74 patients were boys and 13 were girls. The average time for radiological union was 5 weeks for metaphyseal fractures and 6-8 weeks for diaphyseal fractures. At six months final assessment, there were 58 excellent, 19 good, 8 fair and 2 poor results.

**Conclusion:** Excellent to good results can be achieved by percutaneous or open intramedullary bone fixation in unstable fractures of radius and ulna in children and adolescents.

## INTRODUCTION

Childhood fractures contribute a significant morbidity in Nepalese families especially in rural society. Fractures of

radius and ulna are the commonest fracture occurring in children bones<sup>1</sup>. The common sites for fracture in radius and ulna are distal third of the bone in the metaphyseal region. The next common site is somewhere in the shaft of the bones. These fractures occur either in radius or in ulna but most often fractures occur in both bones simultaneously. Rates are higher in boys than girls. The mean age for boys and girls at the time of forearm bones fracture is 8.97 and 5.98 years respectively<sup>2</sup>. These fractures occur either in greenstick type incomplete form or complete form. These usually occur with significant deformities like displacement, angulations and rotation.

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Moderate degrees of deformities of the fractures make them unstable. Unstable fractures of fore arm are the main cause lending morbidity in rural areas of our country.

The traditional method of treatment of fractures of radius & ulna in our country is closed reduction and plaster cast immobilization. By the time the patient arrives to the secondary or tertiary treatment centers from rural areas, the limb is usually grossly swollen. Closed reduction is done and plaster cast is applied. Cases are followed with immediate check x-rays. The reduction may or may not be achieved up to acceptable level of standard. Even the substandard quality of reduction is sometimes accepted due to various constraints and with hope to remodel in due course of time. The perfectly reduced fractures too; sometimes get displaced to unacceptable level, because of negligence and in compliance to the follow up instructions. These fractures ultimately land into mal union with subsequent morbidity. Although the conservative treatment is the mainstay in the treatment of childhood fractures of the forearm, there should be no hesitation in considering surgical treatment when the reduction is not up to acceptable standard. Surgical option is also desirable when chances of subsequent displacement is very high or has already resulted in mal union of more than 15 degrees<sup>3</sup>. The basic principle is to reduce the fracture fragments to acceptable level and to maintain this position until the fracture is united. Forearm fractures in children can be treated differently from adult fractures because of continuing growth in bones after the fracture has healed. As long as growing physes are open, remodeling can occur depending upon the remaining years for the physes to close. However, the rotational deformity doesn't remodel whatsoever. In a study, redisplacement of the fractured fragments in long arm plaster cast has been found in 7 to 13% cases in about 2 weeks time<sup>4</sup>. Per cutaneous pinning after reduction under image control guidance for unstable metaphyseal fractures and closed or open intramedullary fixation for diaphyseal unstable fractures are the acceptable method of fixation for radius and ulna in children<sup>5</sup>. The unique properties of the juvenile skeleton make it possible to cope well with traumatic deformities such as angulations, apposition and displacement<sup>6</sup>. While plating is the gold standard method of surgical treatment for adult radius & ulna fractures, pinning is an equally effective alternative in skeletally immature patients due to similar functional and radiographic outcomes<sup>7</sup>.

When compared plating with intramedullary nailing, it is concluded that plating resulted in significantly worse results in regards to surgical approach, operating times, frequency and duration of hospitalization, total expenditure and cosmetic outcome as well. The technique of nailing or pinning has many merits over more traditional plating techniques. It is a less time consuming procedure and easier to remove the metals after union<sup>8</sup>. Intramedullary fixation of an unstable forearm fracture in skeletally immature patients is a safe, child-friendly, minimally invasive technique that allows early functional treatment with an excellent functional and cosmetic outcome<sup>9</sup>.

## METHOD

This descriptive study was conducted in the Department of Orthopedics at the city hospital of Gandaki Medical College, Pokhara, Nepal from 1st Baisakh 2067 to 31st Chaitra 2067 BS (14th April 2010 to 13th April 2011 AD). Necessary written consent was taken from the accompanying near relatives. All those patients from 1 yr to 16 year of both genders irrespective of the cause of the injury; were included in the study who had unstable type of the fracture of either single or double bones of the fore arm.. The fracture sites included the distal metaphyseal region and the whole of the diaphyseal region of the bones. Both fresh fractures and those which had failed closed reduction after primary reduction & immobilization were included in the study.

Patients above 16 years of the age, with open fractures, associated with other major fractures, fractures other than metaphyseal and diaphyseal regions of the bones, stable fractures which did not require reduction before immobilization were excluded from the study. The patients who came from remote hilly regions and showed unwillingness to abide by the protocol of follow up were also excluded from the study.

After case selection, relevant history and x-rays were taken. The protocol of the study and follow up was explained to the relatives. Under intravenous anesthesia closed reduction was achieved in full aseptic manner under image intensifier control. Two appropriate size of the kirschner wires were used per cutaneously to fix the metaphyseal fracture of the radius (CRPP). The corresponding ulnar metaphyseal fracture was not fixed routinely. The diaphyseal fractures were reduced in the similar fashion. In case of both bone fractures; both radius and ulna were closely fixed separately by intramedullary k-wires of appropriate length under C- arm guidance. Sometimes it became necessary to give small incision over the fracture site to guide the k-wire intramedullary in difficult cases (ORIF). The aim was to achieve proper reduction and appropriate fixation whether by closed method or open technique. Wound was closed and above elbow full cast applied.



Patients were followed routinely every month for clinical and radiological union besides any complication. ORIF cases were first followed up in 10-14 days for removal of the skin sutures. After that, they followed up the monthly protocol as in all other cases. The pins and plaster were removed after clinical and radiological union in all cases. Thereafter cases were followed up to six months for functional recovery. The final results were graded according to Price et al criteria as under:

Outcome	Symptoms	loss of forearm rotation
Excellent	No complaint with strenuous exercise	<15°
Good	Mild complaint with strenuous exercise	15-30°
Fair	Mild complaint with daily activity	30-90°
Poor	All other results	>90°

## RESULT

Total 90 patients with unstable fractures of radius/ulna were enrolled in this study. Among them only 87 patients continued for minimum of six months follow up. Three patients who disappeared after removal of the wires were excluded from the study. The age range was 3-16 years with mean age of 10.07 yrs.

36 patients fell in the age group 7-10 yrs. Out of 87 patients, 74 (85%) were boys and only 13 (15%) were girls with male & female ratio 5.7:1 The age group distribution is given in the table below.

Table 1: Age Distribution

Age group(in yrs)	No. of pts	Percentage(%)
1-4	7	8.06
5-8	25	28.73
9-12	29	33.33
13-16	26	29.88

Causes of fractures were different. Maximum number of children 46 (52.87%) had fractures due to various sporting injuries. 22 patients (25.28%) had fractures due to fall from cliffs and heights. 14 (16.09 %) cases were victims of different road traffic accidents. 5 children had other miscellaneous causes of the injuries.

Table 2: Causes of the fracture.

Causes	Number	Percentage
Sporting Injuries	46	52.88
Fall injuries	22	25.28
RTA	14	16.09
Others	5	5.75
Total	87	100

Table 3: Side of the limb

Side involved	Number	Percentage
Left	51	59.63
Right	36	41.37
Total	87	100

In our study left side fractures were more common than right side. Out of 87 cases, 51 (59.63 %) patients had fracture of single or double bones of left side and 36 (41.37%) had fractures of right side. 65 (74.72 %) cases had fractures of both bones, while fracture of radius alone was noticed in 20 (22.98%) cases. Isolated fracture of the ulna was noticed in only 2 cases (2.30%). Similarly, 53 (60.91%) patients had

fractures of the distal third of the radius or both bones and 34 (39.09 %) cases had fractures of the shaft of radius or ulna or both bones together. Out of 87 cases, 81 were treated as primary fixation because of the instability of the fractures. Six cases were treated as secondary fixation within two weeks due to failure of the closed reduction done at various other centers. 71 (81.60%) patients were treated by closed reduction and per cutaneous pin fixation (CRPF) and 16 (18.40%) patients were treated by open reduction & internal fixation by pins (ORIF). All the cases which required open reduction were the fractures of the shaft of the bones.

Table 4: Bones involved

Bones	Number	Percentage(%)
Both Radius/ulna	65	74.72
Radius alone	20	22.98
Ulna alone	2	2.30
Total	87	100

Table 5: Fracture location

Location	Number	Percentage(%)
Distal third of the bones	53	60.91
Shaft of bone/bones	34	39.09
Total	87	100

Table 6: Methods of Bone Fixation

Methods	Number	Percentage(%)
CRPF	71	81.60
ORIF	16	18.40
Total	87	100

Table 7: List of Complications

Complications	Number	Percentage(%)
Loss of reduction	2	2.22
Pin Tract infection	2	2.22
Proximal migration of pin	1	1.11
Total	90	100

Out of 90 cases, 5 patients had developed different types of minor complications. At the time of pin and plaster removal, 2 patients had some degree of loss of reduction. Similarly, 2 patients had minor pin tract infection in case of metaphyseal pins and in one case the metaphyseal pin had migrated further proximally and it required skin incision to locate and remove that pin.

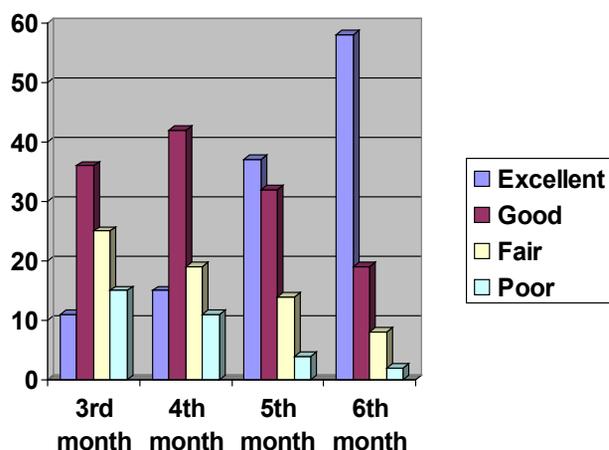


Figure 1: Monthly Outcome of cases according to Price et al criteria

The average time for clinical as well as radiological union for metaphyseal fractures was 5 weeks and 6-8 weeks for diaphyseal fractures. At the time of removal of the cast and pins, there was gross painful limitation of the movement of the wrist and forearm in almost all the cases. Only 5 patients had good result. 24 patients had fair and 61 patients had poor result. Necessary physiotherapy was instructed by our physiotherapy department to every patient. At the end of third month 11 patients had excellent result, 36 patients had good results, 25 had fair and 15 had poor results. At the end of 4th month, there was some improvement in overall result, having 15, 42, 19 and 11 cases in excellent, good, fair and poor group respectively. At fifth month, there was tremendous improvement in overall result with 37, 32, 14 & 4 cases respectively. When final follow up was done at six month, the result was 58, 19, 8 & 2 in excellent, good, fair & poor group respectively.

## DISCUSSION

At the end of six months of mandatory follow up, our study showed 66.66% excellent and 21.83% good result according to the Price et al Criteria. This result has similarity with some other studies done at different centers. Waqar et al in a similar study at Peshawar in Pakistan had 73.40% excellent result at six months follow up on Price et al criteria which is very much similar to our result. A study by Seyfettinoou F and Duygun F showed 82% excellent result when evaluated on Anderson's criteria at two years follow up<sup>3</sup>.

Mostafa MF et al, in a study done at Mansoura, Egypt on 32 forearm fractures had different ratio of boys and girls. They found the male female ratio of 2.2:1 in the study group quite in contrast of ours which is 5.7:1. The age range in that study was 4-16 yrs with mean age of 10.1yrs<sup>10</sup>.

Forearm fractures have been found more frequent in 10-14 yrs age group in an epidemiological study about pediatric fractures in Nepal<sup>11</sup>. It is consistent with most of the similar studies in the sub continent<sup>12</sup>. Our study shows that the bulk of the forearm

fractures fall in the age group 7-10 yrs and 14-15 yrs.

Abu Hassan studied the incidence of dominant hand in forearm fractures in children and adolescents. In their study forearm fractures were more common on left side<sup>2</sup>, while in our study right sided injuries were more common (59.63%) which is similar to the study done by Waqar et al in Pakistan<sup>4</sup>.

Ozkaya U and Parmaksizolu AS recorded 85.7% excellent and 14.3% good results on Price et al criteria in three years follow up with treatment methods of closed reduction and intramedullary nailing of forearm fractures in children and adolescents. They concluded that intramedullary nailing was safe, effective and easy to perform in the management of unstable both bone forearm fractures in children<sup>13</sup>.

Fernandez FF et al concluded after similar study that intramedullary fixation of an unstable forearm fracture in skeletally immature patients is a safe, child-friendly, minimal invasive technique that has excellent functional and cosmetic outcome<sup>9</sup>.

At six months follow up in the study done by Waqar et al in 64 patients who were assessed with price et al criteria had excellent result in 73.40%, good in 15.63%, and fair result in 10.9 % cases. The total percentage of excellent and good results was 89 % in that study which is similar to our study which shows 77% excellent and good results together<sup>4</sup>. They did not record any poor result in their study but we had two cases that showed no satisfactory improvement in the ROM as the time passed on and landed with poor result at least by the end of six months. They may show slow improvement later on in long term follow up.

Another study at Hospital for Special Surgery, New York in June 2008 concluded that nailing of length-stable forearm fractures in skeletally immature patients remains an equally effective and minimal invasive technique when compared with plating in the same age group and similar fractures. It avoids the second operation which is must in case of plating. Hence the authors recommend pinning as the method of choice in such fractures<sup>7</sup>.

In our study, we had included the fractures of the distal third part of radius-ulna also. They have shown excellent result in all the cases without any loss of reduction which was a frequent happening in the past in cases of closed reduction and immobilization in plaster cast without internal fixation. The pin/pins resist any deforming force inside the plaster cast after the swelling has subsided. Even in cases of both bone fracture of distal third of the bones, most often only the radius was fixed internally which helped in maintaining the length, angulations and rotation of the ulna as well. In shaft fractures, the aim of the intramedullary fixation was just to maintain the corrected alignment and not to hold the fragments rigidly. Although the pins used varied in diameter, none of them were intramedullary tightly fitted.

In exploring the reasons of failure of the reduction, we found that patients who didn't comply with plaster cast for the full prescribed duration due to any reason; had loss of reduction.

In those cases; either the plaster cast was weak enough to break before the prescribed duration or they removed the cast themselves prematurely due to various reasons.

Our study has some limitations. The sample size is small. The follow up period is also small which is not optimal. The operating surgeons are different with mixed experience. The sample was not randomized. The study was not comparative with other modalities of treatment for such fractures. A larger randomized sample size with prolonged follow up of minimum two years along with comparative study with other modalities of treatment would be ideal to derive evidence based recommendations.

### CONCLUSION

Based on our study, we can conclude that unstable fractures of shaft and distal metaphysis of both bones of the forearm in children can be per cutaneously or openly fixed with kirschner wires after acceptable reduction and end up with excellent to good results in most of the cases. We also conclude that k-wire fixation of radius alone after reduction of deformities in distal metaphyseal fractures is sufficient to hold the fragments in appropriate alignment till fracture union; provided the fixation is supplemented with external plaster cast immobilization.

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# The Effect of Different Short Term Intensive Therapies on Insulin Release from $\beta$ Cell of Newly Diagnosed Type 2 Diabetic Patients

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## Key words:

Newly diagnosed type 2 diabetes, Intensive therapy, Multiple subcutaneous insulin injections, Oral hypoglycemic agents

## ABSTRACT

**Objective:** To study the insulin release of  $\beta$  cell after different intensive therapies on newly diagnosed type 2 diabetic patients.

**Methods:** Twenty each newly diagnosed type 2 diabetic patients were respectively treated with multiple subcutaneous insulin injections (ultra short acting insulin analogue) and oral hypoglycemic agents (OHA). Insulin and the dose of oral agents were adjusted so that the blood glucose was strictly controlled. Measurement of height, weight and the laboratory test of HbA1c, OGTT, TG, CRP, HOMA- $\beta$ , and HOMA-IR were done before the experiment. Repeat tests were performed after 3 months.

**Results:** After 3 months of intensive treatment, insulin group showed significant increase in the early and late phase of insulin release and the time of peak release moved forward. There was increase of insulin release in OHAs group, but the peak release was still on 2 h post prandial. HOMA- $\beta$ , HOMA-IR, FINS, 0.5h INS, 1h INS, 2h INS level of insulin group had significant difference compared with OHAs group ( $p < 0.05$ ).

**Conclusion:** The short course of intensive insulin therapy had significant effect in the release of insulin from  $\beta$  cell. OHAs can control blood glucose but cannot improve  $\beta$  cell function nor prevent its deterioration.

## INTRODUCTION

Type 2 diabetes is a slowly progressive disease, with the key defect being the insulin resistant and  $\beta$  cell dysfunction. Insulin resistant exists throughout the course of the disease and  $\beta$  cell dysfunction is a must for the progression of the disease and the gradual loss of  $\beta$  cell is a driving force in the progression of the disease.<sup>1</sup> No matter what type of treatment we use, there is a gradual deterioration of the  $\beta$  cell. The cause apart from genetic might also be the glucotoxicity, lipotoxicity and

inflammatory factors inhibiting the  $\beta$  cell function. Prolonged glucotoxicity might be the major factor inducing the defect in the  $\beta$  cell function that leads to the decrease in insulin release, early hyperproinsulinaemia, insulin resistant and eventually the change in morphology of the  $\beta$  cell<sup>1,2</sup>. In the early stage,  $\beta$  cell function can be reversible. For the protection of  $\beta$  cell and delay in the progression of the disease, it is important to strictly control blood glucose. In the later stage because of apoptosis of  $\beta$  cell and amyloid proteinosis, there is a decrease in  $\beta$  cell mass and its function from deterioration progresses to deprivation.

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There are patients still believing that use of insulin will lead to insulin dependence, for that they are reluctant to use insulin. Many researches have already shown that the early use of insulin is very important for the reversal of  $\beta$  cell function.

Early use leads to the resting of  $\beta$  cell<sup>3</sup> and will inhibit the  $\beta$  cell damage caused by the glucotoxicity, lipotoxicity and inflammatory factors. In this research we wanted to see whether oral hypoglycemics are also equally effective in the early reversal of  $\beta$  cell. If this is true then the oral agents are convenient and easy to use and those can be the drug of choice for many of the type 2 diabetic patients.

## METHODS

### Research design:

Inpatients and outpatients from the department of Endocrinology of Zhongnan hospital, Charak hospital and Manipal hospital where enrolled from September, 2005 to December, 2010. Based on 1999 WHO diagnostic criteria, 40 newly diagnosed type 2 diabetes patients were randomly divided in to 2 groups (Insulin and OHAs group), 20 cases in each group.

Inclusion Criteria: Newly diagnosed type 2 diabetic patients whose blood glucose was not satisfactorily controlled with diet and exercise, age < 50 year, BMI < 28 kg/m<sup>2</sup>, without previous history of glucose and lipid lowering drugs use.

Exclusion Criteria: Diabetes ketoacidosis, history of autoimmune disease, severe hepatic and renal diseases, cardiac and thyroid abnormalities.

### Steps:

(1) Treatment was held immediately after admission and on targeted outpatients. Height, weight, waist circumference (WC), blood pressure (BP) and heart rate (HR) were measured.

(2) After an overnight fasting of 8- 12 hours, the morning dose of all drugs was avoided. At 7am oral glucose tolerance test (OGTT) was performed. Blood was sent for lipid profile, fasting plasma glucose (FPG), glycosylated haemoglobin c (HbA1c), fasting insulin (FINS) and c reactive protein (CRP). The OGTT was performed with 75g anhydrous glucose at 30 minutes, 1 hour, 2 hours and 3 hours.

(3) After the test, all the patients were divided into 2 groups randomly, 20 patients in each group. In insulin group ultra short

acting insulin analogue (Novolog 300U/ml) was given prior to three meals and ultralong acting insulin analogue (Glargine) before sleep. OHAs group were treated with oral hypoglycemic (one, two or three pills) till the strict control of the blood glucose was achieved. Patients were kept on diet and exercise therapy as well.

(4) During the course of treatment glucometer was used twice weekly to test blood glucose 7 times a day (3 pre and post meals and 1 before sleep). Basal, pre meal and oral hypoglycemics dose was adjusted according to blood glucose level. Blood glucose was aimed for FPG < 7mmol/l, 2h PPG < 10mmol/l. The use of insulin in insulin group was stopped after 2 weeks. After 2 weeks insulin groups were kept under strict control of diet and reliable exercise. If fluctuation in blood glucose occurred, subjects were treated with novolog. In OHAs group oral agents were continued.

(5) Follow Up: All patients were advised to continue with diet and exercise, self monitoring of the blood glucose and appropriate medical therapy. They were kept in regular supervision of the attending physician. Appropriate adjustment was done for the fluctuation in glucose level.

Capillary blood glucose was measured 7 times a day, twice a week and the findings were recorded.

After 3 months of therapy, OGTT, lipid profile, HbA1c, CRP and measure of height, weight, WC, BP, HR were repeated.

Blood glucose control Criteria:

FPG < 7.0mmol/l and 2h PPG < 10mmol/l were considered satisfactory. Hypoglycemia: if blood glucose < 3.5mmol/l, severe hypoglycemia: if blood glucose < 2.8mmol/l.

Mean  $\pm$  SD ( $X \pm S$ ) was used for enumeration data. Oneway ANNOVA method was use in comparing the means between the groups. The t-test was used to compare means before and after therapy. The  $p < 0.05$  was considered to be statistically significance. For non normal distribution, the numerical value were calculated after taking in to account their natural logarithm. Data processing were done with SPSS 11.5 software.

## RESULTS

Table 1 Comparison between groups before treatment

Group	No.	Age	BMI(kg/m <sup>2</sup> )	FPG(mmol/L)	HbA1C (%)	HOMA $\beta$
Insulin	20	41.0 $\pm$ 6.1	24.0 $\pm$ 2.1	11.0 $\pm$ 4.5	8.5 $\pm$ 1.6	31.4 $\pm$ 1.6
OHAs	20	41.0 $\pm$ 5.1	24.1 $\pm$ 2.0	10.9 $\pm$ 5.3	9.0 $\pm$ 0.8	34.8 $\pm$ 1.0

Group	No	TG (mmol/L)	CRP(mg/L)	HOMA-IR	
Insulin	20	1.89 $\pm$ 1.2	3.21 $\pm$ 1.17	6.72 $\pm$ 2.2	
OHAs	20	1.85 $\pm$ 1.3	3.54 $\pm$ 1.13	6.13 $\pm$ 2.0	
Group	INS0h(mu/l)	INS 0.5h(mu/l)	INS 1h(mu/l)	INS2h(mu/l)	INS3h(mu/l)
Insulin	11.8 $\pm$ 1.1	15.8 $\pm$ 4.2	19.3 $\pm$ 9.8	24.8 $\pm$ 10.5	17.8 $\pm$ 7.2
OHAs	10.6 $\pm$ 1.8	16.1 $\pm$ 3.8	20.6 $\pm$ 5.5	25.2 $\pm$ 9.9	20.4 $\pm$ 6.4

Table 2 Comparison between groups after treatment

Group	No.	Age	BMI(kg/m <sup>2</sup> )	FPG(mmol/L)	HbA1C(%)	HOMA $\beta$
Insulin	20	41.0 $\pm$ 6.1	24.4 $\pm$ 2.1	6.9 $\pm$ 2.3*	6.5 $\pm$ 0.4*	100.4 $\pm$ 11.2*
OHAs	20	41.0 $\pm$ 5.1	24.4 $\pm$ 2.0	7.5 $\pm$ 3.5*	6.9 $\pm$ 0.6*	43.8 $\pm$ 7.8
Group	No	TG (mmol/L)	CRP(mg/L)	HOMA-IR		
Insulin	20	1.09 $\pm$ 1.1*	1.21 $\pm$ 0.27*	4.7 $\pm$ 2.5*		
OHAs	20	1.05 $\pm$ 1.3*	1.54 $\pm$ 0.33*	5.7 $\pm$ 4.2		
Group	INS0h(mu/l)	INS 0.5h(mu/l)	INS1h(mu/l)	INS2h(mu/l)	INS3h(mu/l)	
Insulin	17.1 $\pm$ 1.2*	29.5 $\pm$ 8.9*	28.1 $\pm$ 11.9*	13.2 $\pm$ 4.1*	11.5 $\pm$ 3.4	
OHAs	10.7 $\pm$ 1.5	18.3 $\pm$ 3.6	29.3 $\pm$ 9.8*	31.2 $\pm$ 7.1	21.5 $\pm$ 5.9	

Comparison before and after treatment \* $p < 0.05$

BMI: Body mass index

FPG: Fasting plasma glucose

HbA1c: Glycosylated haemoglobin c

HOMA-B: Homeostatic model assessment of beta cell function

TG: Triglyceride

CRP: C reactive protein

HOMA-IR: Homeostatic model assessment insulin resistant

INS: Insulin at 0.5 hr, 1 hr, 2hr, 3hr

After treatment, in insulin group, FPG and HbA1c decreased, HOMA- $\beta$ , INS 0.5h and INS 1h increased while INS 2h decreased. The difference was statistically significant ( $p < 0.05$ ), which showed the improvement of  $\beta$  cell function. In OHAs group, FPG and HbA1c decreased after treatment and the difference was statistically significant. ( $p < 0.05$ ) The increase in HOMA- $\beta$  was not significant, INS 2h did not decrease ( $p > 0.05$ ), which showed  $\beta$  cell function was not improving.

## DISCUSSION

Type 2 Diabetes (T2 DM) is a gradually progressive disease. The key defect in the pathophysiology of Type 2 diabetes is insulin resistant and  $\beta$  cell dysfunction. Insulin resistant exists throughout the course of the disease.  $\beta$  cell dysfunction is a must for the development of type 2 diabetes. The gradual loss of  $\beta$  cell function is the driving force for the progression of the disease<sup>1</sup>.

### Normal $\beta$ cell insulin release Phases:

**First Phase:** It is the result of release of stored insulin from the secretory granule of  $\beta$  cell which reflects the storage capacity. It starts 1 min after glucose stimulation, peaks at 3-5 min and continues for 10 min. Insulin level rises steadily and falls rapidly.

**Second Phase:** It reflects the synthesis and release of insulin from  $\beta$  cell. It starts after 10-20 min of the glucose stimulation, peaks at 30-60min and continues till the glucose returns to the baseline or the stimulation is lost.

In T2 DM there is a change in the mode of insulin release. The loss or the cut off in the release of first phase can be seen, loss or the delayed peak which reflect the loss of storing capacity. First phase inhibit the hepatic glucose production and its output and

at the same time inhibit the release of glucagon, inhibit lipolysis and the formation of free fatty acid.<sup>8,9</sup> This is important to stop high insulin release after meal and the hypoglycemia prior to the next meal. This can stop the  $\beta$  cell destruction because of gluco and lipotoxicity.

If there is defect in first phase, the second phase release has to increase in order to compensate and control the blood glucose, this will increase the  $\beta$  cell burden and peripheral insulin resistant. For this reason in the compensatory period, there is a rise in the insulin release in most points in the second stage. As the disease progresses to decompensatory phase, there is a decrease in the release from  $\beta$  cell, delayed peak and gradually a even state. Glucotoxicity<sup>4</sup> Lipotoxicity<sup>5,6</sup>, proinflammatory cytokines and leptin (Adipocyte-secreted factors, Increased cell nutrients, Innate immune system and autoimmunity)<sup>7</sup> and Islet cell amyloid all are responsible for progressive loss of  $\beta$  cell function and mass.

In our research, no matter what the type of intensive therapy was, there was a marked improvement in blood glucose before and after treatment during OGTT test ( $p < 0.05$ ). This shows that any type of intensive therapy can effectively control blood glucose. After 3 months of intensive treatment, insulin group showed significant increase in the early and late phase of insulin release and the time of peak release moved forward. In OHA group too there was increase in insulin release but the peak release was still 2 h post prandial. In insulin group HOMA- $\beta$  HOMA-IR, 0.5h INS, 1h INS and 2h INS level had significant difference with OHAs group ( $p < 0.05$ ).

" $\beta$  cell rest" theory can be used to explain improved  $\beta$  cell function and insulin release in insulin treated groups. Exogenous insulin can control blood glucose, can eliminate the  $\beta$  cell inhibition and insulin resistant caused by glucotoxicity and  $\beta$  cell can have sufficient rest thus easing the burden and promoting their repair.

Oral medication (sulfonylurea) at early stage can control blood glucose but because of their ongoing stimulation to release insulin from  $\beta$  cell, more insulin is released in succession which results in increased burden of  $\beta$  cell and the subsequent injury and death of  $\beta$  cell. This inturn speeds up the progression of diabetes, hence is not favorable for the reversal of  $\beta$  cell function and insulin release.

**CONCLUSION**

1. The short course of intensive insulin therapy can improve  $\beta$  cell function and the release of insulin from  $\beta$  cell so that the newly diagnosed T2DM patient can return to the early stage in the natural progression of diabetes.
2. Oral medication (sulfonylureas) at early stage can control blood glucose but because of their ongoing stimulation to release insulin from  $\beta$  cell, more insulin is released which in turn speeds up the progression of diabetes, hence is not favorable for the reversal of  $\beta$  cell function and insulin release.

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# Analysis of Migraine Triggers in Patients Attending Psychiatric OPD at Gandaki Medical College, Pokhara, Nepal.

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## Key words:

Headache, Migraine, Triggers

## ABSTRACT

**Objective:** Migraine headache has identifiable trigger factors. Such identification plays a role in the management.

**Method:** It was a hospital based cross-sectional descriptive study conducted at the psychiatric OPD of GMC, from July 2010 to June 2011. Criteria purposed by the International Headache Society (IHS) were used during the study. Patients who fulfilled the criteria were included in the study only after their consent. Either of sex was included and there was no restriction over the age. All patients were specifically queried as to whether they had noted any specific factors to serve consistently as migraine attack triggers and additionally were surveyed as to whether they might have "other" triggers not listed on the intake questionnaire.

**Results:** Total number of patients involved in the study was 70 (N). Majority of them were female (82.9%) and married (77.2%). Most of the patients were from the age group of 15- 24 years which constituted of 35.8%. Family history of migraine was positive in 28.5% of cases only. Out of the comorbidity associated with migraine, the most common one was anxiety disorder (17.1%) followed by seizure disorder (5.7%). Regarding the migraine triggers, except for the 5 patients, almost all the patients (93%) had multiple triggers i.e. presence of 2 or more triggers. The most common 7 trigger were, in increasing order; skipping meals/ fasting (27.10%), weather changes (28.50%), physical exhaustion (37.10%), changes in sleep pattern (45.70%), bright lights/ sun exposure (52.80%), noises/crowd (58.50%) and emotional stress (71.40%). Among those 5 patients, 3 had single trigger while 2 couldn't identify any trigger.

**Conclusion:** Triggers in migraine are mostly multiple. Identification of triggers plays an important part in the holistic management of patients with migraine as some triggers can be avoidable, allowing the subjects to avoid some migraines.

## INTRODUCTION

Headache is one of the most common human afflictions.

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Community studies have shown that approximately 60% and 80% of general population report severe and milder headache respectively.<sup>1</sup> Migraine is the most common of the disabling primary headache syndromes, often misdiagnosed as tension-type headache, sinus headache and headache due to temporomandibular joint dysfunction.<sup>2</sup> Though more than 80% of those with migraine report that headache leads to impairment in their daily lives, many headache sufferers do not seek treatment.

Migraine is a chronic paroxysmal disorder with a symptoms free state in between the attacks. The attacks are mostly stereotypical in their occurrence and consist of transient focal neurological symptoms, headache, or both. The transient focal neurological symptoms are almost always sensory in nature, generally visual and sometimes somatosensory. Headache can be of such intensity that it interferes with the ability to function to the point of needing a bed rest. Headache comes often associated with anorexia, nausea, photophobia, phonophobia, osmophobia, blurred vision, vomiting or diarrhea etc.<sup>3</sup>

The associated symptoms generally follow the onset of headache and build in intensity as headache increases in intensity. The transient focal neurological symptoms almost always precede the onset of headache or occur during the initial phase of headache and are referred as aura symptoms.<sup>3</sup> Based on the aura, the International Headache Society has differentiated Migraine into without aura and with aura.<sup>1</sup>

Aura occurs between 5 and 30 minutes before the onset of migraine. It is characterized by numbness or a pins and needle sensation in the head and alterations in auditory, olfactory, speech or visual senses like tunnel vision, blind spots, flashes of lights or jagged lines.<sup>1</sup>

In addition, when aura occurs by itself and without headache, the condition is referred as isolated migraine aura or migraine aura without headache.<sup>3</sup>

Therefore migraine is a complex and multifaceted disorder with symptoms emanating from multiple systems like vascular, neurological, gastrointestinal, endocrine and visual along with the changes in behavior, cognition and mood.<sup>1</sup>

The American Migraine Study revealed that approximately 18% of women and 6% of men suffered from migraine in United States and that migraine prevalence varied with age (highest in 35- 45 years olds).<sup>4</sup> But before puberty, the prevalence of migraine is about 5%, both in boys and girls.<sup>5</sup>

Migraine is very commonly associated with triggering factors i.e. triggers and many migraineurs report attack "triggers," but relatively few published data exist regarding the relative prevalence of individual triggers.<sup>6</sup> Triggers are specific factors that may increase the risk of having a migraine attack. Triggers do not cause migraine. Instead, they are thought to activate processes that cause migraine in people who are prone to the condition. A certain trigger will not induce a migraine in every person and in a single migraine sufferer a trigger may not cause a migraine every time.<sup>7</sup> Thus, Triggers vary from one person to the next. Trigger identification and management is an integral part of Migraine management. Some triggers can be avoidable, allowing the subjects to avoid some Migraines. Other triggers can't be avoided, but knowing those triggers is still helpful in the efforts to have fewer Migraines.<sup>8</sup>

## METHODS

The objective of the study was to document the triggers in the patients with migraine attending Psychiatric OPD at GMC from

July, 2010 to June, 2011. Criteria purposed by the International Headache Society (IHS) were used during the study. Patients who fulfilled the criteria were included in the study only after their consent. Either of sex was included and there was no restriction over the age. All patients were specifically queried as to whether they had noted any specific factors to serve consistently as migraine attack triggers and additionally were surveyed as to whether they might have "other" triggers not listed on the intake questionnaire. It is hospital bases cross-sectional descriptive study.

## RESULTS

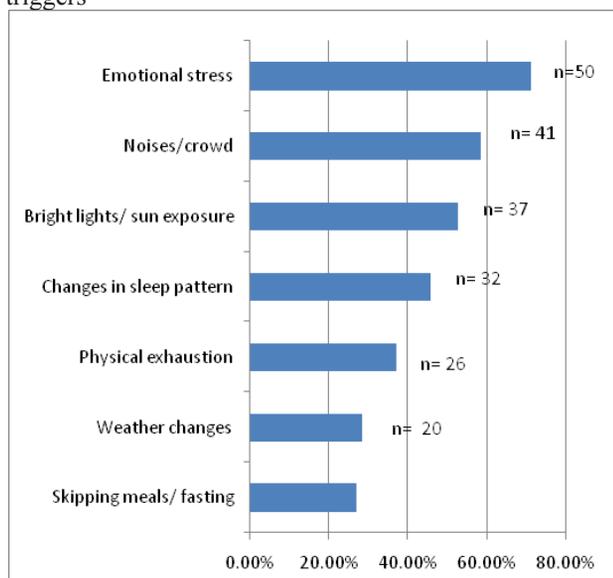
Table: 1 Sociodemographic profile of patients with migraine

Gender	Frequency (n)	Percentage (%)
Male	12	17.1
Female	58	82.9
Total	70	100
Marital status		
Unmarried	16	22.8
Married	54	77.2
Total	70	100
Age distribution		
< 15 years	1	1.4
15- 24 years	25	35.8
25- 34 years	22	31.4
35- 44 years	8	11.4
45- 54 years	13	18.6
> 55 years	1	1.4
Total	70	100
Family History of Migraine		
Present	20	28.5
Absent	50	71.5
Total	70	100
Comorbidity		
Seizure disorder	4	5.7
Dissociative disorder	3	4.2
Anxiety disorder	12	17.1
Alcohol disorder	3	4.2
Somatoform disorder	2	2.8
None	46	66
Total	70	100
Presence of triggers		
Unidentified	2	2.8
Atleast 1	3	4.2
Multiple (2 or more)	65	93
Total	70	100

Table: 2 Analysis of various triggers in patients with migraine

Category	Triggers	Frequency (n)	Percentage (%)
Dietary triggers	Skipping meals/ fasting	19	27.1
	Irregular food habits	5	7.1
	Specific foods (sweet/sour/spicy/dairy)	12	17.1
	Alcoholic drink	5	7.1
Sleep triggers	Changes in sleep pattern	32	45.7
Hormonal triggers	Menstrual cycle	15	21.4
	Injectable/ oral contraceptive	15	21.4
	Peri - and postmenopausal state	10	14.2
	Pregnancy	3	4.2
Environmental triggers	Weather change	20	28.5
	Bright lights/ exposure to sun	37	52.8
	Odours/ Pollution	2	2.8
	Noises/ crowd	41	58.5
Stress triggers	Emotional stress	50	71.4
	Physical exhaustion	26	37.1
	Fatigue/ tired		
Visual triggers	TV/ computers/ eye strain	6	8.5
Others Triggers	Travel, coitus etc	3	4.2
Unidentified		2	2.8

Fig:1 A graph showing the seven most common migraine triggers



Total number of patients involved in the study was 70 (N). Majority of them were female (82.9%) and married (77.2%). Most of the patients were from the age group of 15- 24 years which constituted of 35.8%. Family history of migraine was positive in 28.5% of cases only. Out of the comorbidity associated with migraine, the most common one was Anxiety disorder (17.1%) followed by Seizure disorder (5.7%). Regarding the migraine triggers, except for the 5 patients, almost all the patients (93%) had multiple triggers i.e. presence of 2 or more triggers. The most common 7 trigger were, in increasing order; skipping meals/ fasting (27.10%), weather changes (28.50%), physical exhaustion (37.10%), changes in sleep pattern (45.70%), bright lights/ sun exposure (52.80%), noises/crowd (58.50%) and emotional stress (71.40%). Among those 5 patients, 3 had single trigger while 2 couldn't identify any trigger.

## DISCUSSION

Migraine with its triggering factors is a very common disorder. Yet very few studies have been done on the migraine triggers.<sup>6</sup> Identification of triggers is an important part of assessment and treatment of patients with migraine headache. The triggers tend to differ from person to person. Therefore, though the diagnosis may be the same, the method of approach at controlling or avoiding the migraine attacks can differ on the individual basis. For example, managing a case with skipping of food as a trigger and the other with the use of oral contraceptive pill as a trigger can markedly differ though the advice and counselling may appear simple enough. Highlighting what may appear as a simple process becomes important as migraine is often underdiagnosed and undertreated.<sup>4</sup> Majority of the subjects (93%) reported multiple triggers. Such finding was also revealed in the study of migraine triggers performed by Andress- Rothrock D et al<sup>6</sup> and Yadav RK et al<sup>9</sup> in India where the presence of multiple triggers were 82.5% and 34.4% respectively. In the study by Andress- Rothrock, the common triggers were emotional stress (59%), sleep disturbances (53.5%), odours (46.5%), missing meals (39%) and 62% of actively cycling female reported menses as triggers. Authors further state that the types of triggers reported were similar to those reported by clinic- based populations in San Diego, California, Alabama and among the Hispanics.<sup>6</sup> Similarly in the Indian study by Yadav RK et al, the common triggers were emotional stress (70%), fasting (46.3%), physical exhaustion (52.5%), sleep deprivation (44.4%), menstruation (12.8%) and weather changes (10.1%).<sup>9</sup> In a Danish Study by Hauge AW et al, the common triggers were stress, reflected sunlight and too little sleep.<sup>10</sup> Comparing with the current study, we can conclude that the migraine triggers do not seem to vary much according to geographic region or race and ethnicity.

## CONCLUSION

Triggers in migraine are mostly multiple. Identification of triggers plays an important part in the holistic management of patients with migraine as some triggers can be avoidable, allowing the subjects to avoid some Migraines.

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# Assessing the Outcomes of Management of Open Tibial Fractures by External Fixation and Early Bone Grafting

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## ABSTRACT

### Key words:

Open tibial fracture, External fixation, Bone grafting, Outcomes

**Objective:** To assess the outcomes of management of open tibial fractures.

**Methods:** This was a prospective study of two years duration. Patients with open fracture of tibia, which were treated with external fixation and early bone grafting, were included in the study. Patients with open tibial fractures associated with other fractures in the same limb, patients with open tibial fractures which were treated conservatively, fractures in immature skeleton and patients having immediate amputation were excluded from the study. The necessary investigations and interventions were done. The data were collected at the time of arrival in hospital, during operation, hospital stay, at the time of discharge and at the follow up visit. The criteria documented by Gustilo and Anderson were followed for the type of recognition of open fracture. The functional grading system introduced by Alho et al 1990 was used.

**Results:** The total number of cases enrolled in the study was 50, out of which, 41 were males and 9 were females and the age of the patients ranged from 16-59 years. Most common site of diaphysis involved in fracture was middle 1/3rd consisting of 25 (50%). Type II open fractures were seen in most of the cases, 29 (58%). Culture obtained from contaminated wound was positive in 17 (34%) cases. Soft tissue healing was achieved in average time of 6.7 weeks (2-24 weeks). The total duration of use of external fixation was 9.1 weeks (6-20 weeks). Time required for union was 18 weeks. Delayed union, malunion and nonunion in our series was 24%, 4% and 2% respectively. Functionally, 34 (68%) had excellent result.

**Conclusion:** Managing the open tibial fractures by external fixation and early bone grafting in majority of the cases have excellent to fair functional outcomes.

## INTRODUCTION

The management of open fracture is a problem of continuing concern and can constitute a major therapeutic challenge (Ger

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1970,<sup>1</sup> Vasconez 1973<sup>2</sup>). Open fracture is said to exist where there is breach in the continuity of the soft tissue and the fracture hematoma communicates with external environment. Grades of open fractures depend upon several factors like extent of soft tissue damage, contamination of wound, presence or absence of neurovascular injury and presence or absence of infection. The open fractures are different from closed fractures because of increased risk of infection, problems of wound care, soft tissue coverage problem and limitation of internal fixation

and decreased complications of osteomyelitis and septic non-union.

The functional result of open tibial fractures managed by primary immobilization, primary closure or delayed primary closure and second stage skin grafting if required is not always encouraging because of prolonged hospitalization, infection, delayed union, non union, joints and soft tissue contractures.

The difficulties arise because in open fractures with exposed bone, the risk of complications is considerable and present to provide coverage has not always been successful. Infection has been a major problem. It may cause delayed healing in soft and hard tissues. This leads to prolonged morbidity. Also once the osteomyelitis occurs the sequelae cause much distress to the patient.

The methods of treatment for complex open fractures such as debridement and healing by secondary granulation tissue, skin grafting or bone grafting over such tissue may provide satisfactory early results (Jones and Ciernay 1980<sup>3</sup>). For all the procedure external fixation is the best choice.

In contrast with closed fractures, all the open fractures are not suitable for open reduction and internal fixation, therefore in open tibial fractures; we are more concerned with prevention of infection at the onset and treating of infection if it has already been established. Soft tissue damage in open fractures is the most important factor causing delayed union or non-union (Rommens and Bross 1992<sup>4</sup>).

Despite improved techniques of fixation and pre-operative coverage of antibiotics, infection and non-union still occur in many patients after severe open fractures of the tibia (Clancey and Hansen 1978, <sup>5</sup> Gustilo et al 1984 <sup>6</sup>). External fixation, plaster cast, pin and plaster or traction depending upon the individual situation can provide stabilization. External fixation in open tibial fractures is best suited for reasons of convenience and efficacy.

Conversion from external to internal fixation (Plates and intramedullary nails) after soft tissue healing of open tibial fractures is not recommended because of the increased risk of infection (Blick et al 1988).<sup>7</sup> Behrens (1989)<sup>8</sup> reported good results with weight bearing in external fixation. Although many different methods have been advocated for the initial treatment of open tibial fractures, external fixation remains the most commonly employed technique. External fixation has been associated with higher rates of delayed union and non-union than other modalities of treatment (Blachut et al 1990,<sup>9</sup> Gersuni and Halma 1983,<sup>10</sup> Behrens 1984<sup>11</sup>). They reported a statistical significant decrease in healing time of severe open tibial fractures that were bone grafted within 30 days of injury.

Because the natural history of open tibial fractures is delayed union, early bone grafting is recommended to decrease time of disability. In contrast to the traditional concept of bone grafting after delayed union has been diagnosed (i.e. 20 weeks after injury), prophylactic bone grafting is performed under the assumption that delayed union will routinely follow high energy tibial fracture to reduce the total time of disability

(Charnley 1961)<sup>12</sup>.

## METHODS

This was a prospective study of two years duration, from January 1997 to December 1998, conducted at orthopedics department of Service Hospital at Lahore, Pakistan to assess the outcomes of management of open tibial fractures. Patients with open fracture of tibia, which were treated with external fixation and early bone grafting, were included in the study. Patients with open tibial fractures associated with other fractures in the same limb, patients with open tibial fractures which were treated conservatively, fractures in immature skeleton and patients having immediate amputation were excluded from the study.

Necessary resuscitation and the splintage to the injured leg were carried out immediately. Blood investigation, radiography and ECG were done. Wound swab from the wound site was sent for the culture and sensitivity test. The criteria documented by Gustilo and Anderson (1976) were followed for the type of recognition of open fracture.

The necessary pre-operative work-ups were done. In operation theatre a general or spinal anaesthesia was given. Wound debridement was done properly and washed thoroughly with pyodine and normal saline. Bone was fixed with AO external fixation and at least two schanz screws were applied above and below the fracture site. Bone graft was taken from the iliac crest and put on the fracture site. The wound was washed and pin site were covered with pyodine soaked gauze piece. Thereafter the post-operative care was carried out. The data were collected at the time of arrival in hospital, during operation, hospital stay, at the time of discharge and at the follow up visit. At each follow-up visit radiographic records were noted. The functional grading system introduced by Alho et al (1990) was used.

## RESULTS

The total number of cases enrolled in the study was 50. Out of 50 patients, 41 were males and 9 were females and the male to female ratio was 4.56:1. The age of the patients ranged from 16-59 years. The peak occurrence of tibial fracture was seen in the age group of 21-30 years that is the third decade. 26 (52%) out of 50 were from this age group. The next common age groups were between 11-20 and 41-50 years (16%).

In present study, when considering RTA as a mode of injury, 15 (50%) patients were injured in pedestrian, 8 (26.6) were injured in motorcycle accident and 3 (10%) were in car accident. 13 (26%) fell from height. Out of 50 open tibial fractures, in 30 (60%) were in right leg while in 20 (40%) left leg were involved.

Most common site of diaphysis involved in fracture was middle 1/3rd. 25 (50%) were in the middle 1/3rd of the tibial shaft. Next common site affected was lower 1/3rd (28%) and the least was proximal 1/3rd (22%).

Out of total 50 open tibial fractures, type II open fractures were 29 (58%). Next common grade was the type III open fractures, which were 17 (34%). In respect to type of fractures out of 50

open tibial fractures, 17 were transverse, 17 were oblique and 16 were comminuted.

Culture obtained from contaminated wound was positive in 17 (34%) cases out of 50 cases. Most common was staphylococcus, which was obtained in 12 (70.5%) cases. Next was the Klebsiella and Pseudomonas species which were positive in 2 (11.7%).

Soft tissue healing was achieved in average time of 6.7 weeks (2-24) weeks. In present series, there were 5 (10%) pin tract infection. The total duration of use of external fixation was 9.1 weeks (6-20 weeks), In our series joint stiffness at ankle were seen in 8% and there was no knee joint stiffness. Time required for union in our series was 18 weeks. Delayed union, malunion and nonunion in our series was 24%, 4% and 2% respectively.

Finally, out of the 50 fractures, 34 (68%) had functionally excellent result, 12 had good, 2 had fair and 2 patients did not followed up properly.

## DISCUSSION

Open tibial fractures, continue to be among the most challenging injuries to the orthopaedic surgeons. The problems are attributable mainly to the skin injury, infection to other soft tissues and severity of bone damages. Open wound over a fracture almost invariably means that the fracture is contaminated. Other soft tissues are most severely injured in patients with open than in those with closed fractures, which causes fracture to be unstable and compromises the circulation in the fracture area. These can cause delayed union or nonunion. With a view to avoid therapeutic difficulties and a high incidence of healing disturbances and complications in external fixation as a relatively safe and risk free method if it is performed in the proper manner.

### Total cases and Gender Distribution:

Out of total 50 patients 41 were males and 9 were females and the ratio was 4.56:1. In other studies by Rommen and Schmit-Neuerburg,<sup>13</sup> Thakur and Panatkar,<sup>14</sup> and Sultan et al<sup>15</sup> males were dominant in numbers. Males are predominantly affected in tibial fractures as they spend active life, specially the young adult males who are more enthusiastic about life and careless about speed during driving. Females usually have sedentary life style.

### Age Incidence:

The age of our patient ranged from 16-59 years. Tibial fracture is a common occurrence in adults. The peak incidence in our study was from 21-30 years, the third decade. More than half of the patients, 26 (52%) were from this age group. The next common age groups were between 11-20 and 41-50 years (16%). This result is similar to the result of Singer et al (1998)<sup>16</sup>.

In the study by Wiss (1986)<sup>17</sup> with 135 fractures of tibia, the age the patients ranged from 15-83 years with average age of 29.8 years. Rommen and Schmit-Neuerburg (1987)<sup>13</sup> reported a series of 276 patients in which the majority of age group affected was 10-19 years and the second most affected group

was 20-29 years. As the person become more active greater is the chances of tibial fractures. In our social setup persons is more involved in daily activities in third decade and late second decade of life. So they are more likely to be affected.

### Limb Affected:

Out of 50 open tibial fractures, nearly two- third of the fracture i.e. 30 (60%) were in right leg. In the studies by Naveed and Behren & Searls (1986)<sup>18</sup> the dominant side of fracture was the right side. Higher incidence of right tibial fractures is probably due to predominance of right hand in 93% population.

### Nature of Injury:

Karlstrom and Olerud (1983)<sup>19</sup> reported that direct hit is the most common mechanism responsible in more than 80% of the fractures; most of the accidents were traffic accident (68.9%), industrial accident (14.6%), accident at home (8.6%) and sports accident (7.9%) were less important. Pedestrian were the most frequent victim group in traffic accident (41.5%) in the series of Rommen and Schmit-Neuerburg (1987)<sup>13</sup>. Incidence of open tibial fracture is higher in RTA. Present study matches the other studies in which RTA is the most common cause of open tibial fractures.

### Site, Grade and Type of Fracture:

Regarding the diaphyseal involvement, our study showed that half of the fracture occurred in the middle 1/3rd. Middle 1/3rd of the tibial shaft may be the site mostly struck by a direct hit. Present study matches with most of other studies like Velazco and Fleming 1983,<sup>20</sup> Wiss 1986,<sup>17</sup> Rommens and Schmitz-Neuerburg 1987,<sup>13</sup> Court-Brown et al 1991<sup>21</sup>, all of which showed that middle 1/3rd as the most common site followed by the distal 1/3rd. These two are mostly involved in motorcycle accident, which may be the likely cause.

Out of 50 cases, in respect to type of fractures, 17 were transverse, 17 were oblique and 16 were comminuted. These results were not comparable with those of Rommens and Schmitz (1987)<sup>22</sup>, which shows 49.1% were oblique and transverse, 26% spiroid, 5.5% comminuted, 11.6% multifragments and 7.8% bifocal.

### Bacterial Flora:

In our study, culture from the wound site showed that Staphylococcal was positive in 12 (70.5%) cases, Klebsiella and Pseudomonas species were positive in 2 cases, each. The studies by Rommen and Schmitz 1987,<sup>22</sup> Gustilo et al 1976<sup>23</sup> and Naveed 1990<sup>18</sup> showed that the staphylococcus was most common organisms obtained in the culture.

### Soft Tissue Injury:

Every attempt was made to cover the bone with soft tissue at the earliest. Early aggressive reconstruction of soft tissue over exposed bone significantly reduces the risk of infection, non-union and subsequent amputation Caudle and Stern 1987<sup>24</sup>. Split thickness skin grafting was used in most of our patient to cover the wound (42%). Local muscle flap rotation was done in two cases, in which soleus muscle flap was rotated over the

exposed bone in middle 3rd of tibial shaft. It was followed by skin grafting. Delayed suture was the second common method to closed wound, 15 (30%) and primary closure in 12 (24%) patients.

#### **Pin Tract Infection:**

In present series, pin tract infection occurred in 5 (10%) cases. These cases responded well to local cleaning with soap and water and dressing of pin site and intravenous antibiotics only. There was no need of pin removal and curettage of pin tract.

Pin tract infection is quite frequent occurrence of external fixation. Burny et al (1979)<sup>25</sup> reports in his analysis of 5152 observations of single pin used for tibial fixation that during the first 150 days, less than 50% of the pin caused significant reaction (redness, discharge, osteolysis). However this percentage increases with time. According to Maurer et al 1989,<sup>26</sup> longer the period of external fixation, greater is the risk of pin tract infection with persistent suppuration. A review of literature by Green and Ripple (1984)<sup>27</sup> revealed that an incidence rate of residual osteomyelitis in a pin tract infection after external fixation was 0-4%.

#### **Duration of External Fixation:**

In our study, total duration of use of external fixation was 9.1 weeks (6-20 weeks), which was better than the report of Thakur and Panatkar (1991)<sup>14</sup> where total duration was 13.5 weeks.

#### **Time for union:**

Time required for union in our series was 18 weeks, which was quicker than in other studies. Melendiz and Colon (1989)<sup>28</sup> reported union time of 22.6 weeks, Clifford et al (1988)<sup>29</sup> reported 25 weeks, Thakur and Panatkar (1991)<sup>14</sup> reported 20 weeks, Larson and Linden (1983)<sup>30</sup> reported 23 weeks, Naveed (1990)<sup>18</sup> reported 21 weeks whereas Edward et al (1988)<sup>31</sup> reported 9 months.

Delayed union, malunion, and nonunion in our series was 24%, 4% and 2% respectively. Thakur and Panatkar (1991)<sup>14</sup> reported 6.8% malunion while Edward et al<sup>31</sup> reported 9% malunion and 3% nonunion.

#### **Other Complications:**

In our series joint stiffness at ankle developed in 8% of the cases but there was no knee joint stiffness. In the series of Thakur and Panatkar (1991)<sup>14</sup> there were 10.9% of ankle stiffness, in Nesbaken et al (1988)<sup>32</sup> 30.7%, in Clifford et al (1988)<sup>29</sup> 20.8% and 5% was reported by Edward et al (1988)<sup>31</sup>.

Finally, in our study, out of the 50 fractures, 34 (68%) had functionally excellent result, 12 had good, 2 had fair result whereas 2 patients did not follow up properly.

#### **CONCLUSION**

Managing the open tibial fractures by external fixation and early bone grafting in majority of the cases have excellent to

fair functional outcomes.

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# The Relationship between CA-125 Level and Ovarian Tumor Size: 7 Years of Retrospective Study

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## Key words:

Increased CA-125, ovarian tumor, size

## ABSTRACT

**Objective:** To evaluate the role of CA-125 in determining the size of ovarian tumor

**Methods:** Retrospective review of 75 cases of ovarian cancer in Third Affiliated Hospital to Zhengzhou University, Henan, China from the year 1999 to 2007.

**Result:** In 20 cases tumor size were <5cm, in 22 cases the diameter was 5-10 cm and >10 cm in remaining 33 cases. CA-125 level was < 35 in 22 cases, where as in remaining 53 cases the levels were grossly elevated. ANNOVA and LSD post hoc multiple comparison tests were used for statistical analysis.

**Conclusion:** Higher level of CA-125 may indicate the greater size of tumor. (p<0.05)

## INTRODUCTION

It is a well known fact that CA-125 is a best available marker for screening ovarian cancer. However, it fails to reach the specificity needed for a screening test for early detection. Only 50% of patients with stage I ovarian cancer will have an elevated CA-125 level.<sup>1,2</sup> Ultrasound and computed tomography of abdomen and pelvis are frequently used to determine the location, size, extension and characteristics of ovarian mass in patients suspicious of ovarian cancer. It is still unclear if elevated levels of serum CA-125 marker can predict size of ovarian mass in such individuals.

## METHODS

We retrospectively reviewed 75 cases of ovarian cancer in Third Affiliated Hospital to Zhengzhou University, Henan,

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China from the year 1999 to 2007. The diagnosis of ovarian cancer was confirmed along with its type according to histopathological report of the specimens, which were either sent during or after surgery. All the data were collected from hospital record section and statistical analysis were assisted by SPSS 12.0 software. For statistical analysis one way analysis of variance (ANOVA) and LSD post hoc multiple comparison test were used to see the relationship between serial elevation in CA-125 level and ascending size of ovarian tumor. The relationship was considered significant when p<0.05. The size and location of ovarian mass were measured according to Ultrasound (USG) finding of abdomen and pelvis.

## RESULT

We performed USG abdomen/ pelvis and CA-125 analysis in all 75 cases. Serum CA-125 level was found to be elevated in 53 (61.5%) cases, where as in remaining 22 cases it was within normal limits. Tumor size was measured according to USG report and was re-verified at intra operative period. In 20 (26.6%) cases, tumor size was <5 cm in diameter, where as the diameter of tumor was 5 to 10 cm in 22 (29.4%) cases

and in remaining 33 (44%) the tumor was more than 10 cm in diameter. Similarly, location wise, bilateral ovaries were infiltrated in 31 (41.4%) cases, followed by unilateral right and left ovary in 23(30.6%) and 21(28%) cases respectively. Histopathologically, most (28%) of the tumors were serous cystadenomas.

Relationship between CA-125 level and size of the tumor:

Because of the varying size of the tumor, it was distributed in 3 groups according to the diameter as per intra operative findings. In 20 cases tumor size were <5cm, in 22 cases the diameter was 5-10 cm and >10 cm in remaining 33 cases. CA-125 level was < 35 in 22 cases, 35-100 in 18, 101-200 in 17 and >200 in 18 remaining cases. (Table 1) We performed ANOVA and LSD post hoc multiple comparison test to compare means between the individual groups. The test was considered significant if  $p < 0.05$

Table 1: Distribution of tumor size (mm) according to CA-125 level

CA125	f	Mean tumor size (mm)	Std. Deviation
<35	22	53.63	31.71
35-100	18	81.22	34.84
101-200	17	96.82	40.72
>200	18	120.94	26.30

Table 2: ANNOVA test between the two variables

	Sum of Squares	Df	Mean Square	F	P value
Between Groups	54459.26	4	13614.8	13.05	<0.001
Within Groups	73018.74	70	1043.12		
Total	127478	74			

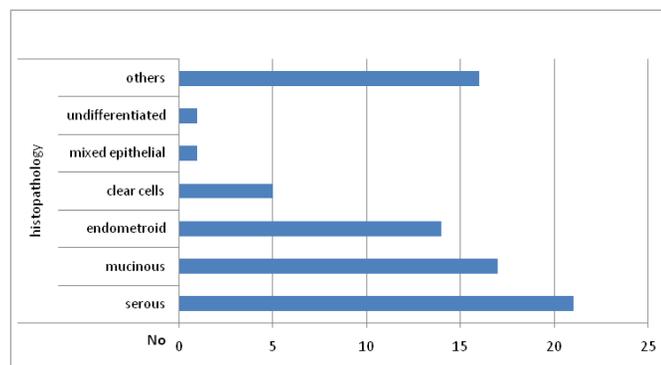
At least one of the mean is different

Table 3: LSD multiple comparison test

(I) CA125	(J) CA125	Mean Difference (I-J)	Std. Error	p value
<35	35-100	-27.58	10.67	<0.05
	101-200	-43.18	10.84	<0.001
	>200	-67.30	10.67	<0.001
35-100	<35	27.58	10.67	<0.05
	101-200	-15.60	11.35	>0.05
	>200	-39.72	11.19	0.001
101-200	<35	43.18	10.84	<0.001
	35-100	15.60	11.35	>0.05
	>200	-24.12	11.35	<0.05
>200	<35	67.30	10.67	<0.001
	35-100	39.72	11.19	0.001
	101-200	24.12	11.35	<0.05

The test shows that size of the tumor definitely reflects the level of increased CA-125

Chart 1: Histopathological distribution of 75 cases of ovarian cancer



## DISCUSSION

The morbidity of ovarian cancer has increased gradually in the recent years. The most promising approach to ovarian cancer management is early detection. Currently, the methods used for the evaluation of women with suspected adnexal masses are physical examination, ultrasound and determination of serum CA-125 levels or a combination of both.<sup>3,4</sup>

CA-125 is an antigenic determinant of a high molecular-weight glycoprotein recognized by a monoclonal antibody (OC 125).<sup>1</sup> CA-125 level >35 U/ml is considered to indicate suspected malignancy. However, only 50% of patients with stage I ovarian cancer will have an elevated CA-125 level.<sup>1,2</sup> The diagnostic accuracy of ovarian tumors is significantly improved by combining ultrasound and CA-125 findings.<sup>5</sup> At present, CA-125 is the best available marker for epithelial cancer, although it lacks sensitivity for stage I disease and lacks specificity for the early diagnosis of ovarian cancer. CA-125 levels alone do not provide good sensitivity or specificity for the distinction between malignant and benign pelvic masses.<sup>6</sup>

In our knowledge, there are very few studies to analyze the correlation between the tumor markers and the size of ovarian tumor. In one study, it has been cited that the high level of tumor markers, especially CA-125 and CA-19-9 indicate the larger tumor size.<sup>7</sup> We hope that this review will help the use of CA-125 marker in determining the size of the tumor, besides screening for ovarian cancer and observing treatment response following chemotherapy.

## CONCLUSION

Ca-125 analysis may also be used to determine the size of ovarian tumor. Higher level of CA-125 may indicate larger tumor size.

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# Study of Closed Reduction and Percutaneous Lateral Pin Fixation in the Treatment of Displaced Supracondylar Fractures of the Humerus in Children

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## ABSTRACT

### Key words:

Children, Supracondylar fracture, Outcome

**Objective:** To evaluate the results of closed reduction and percutaneous lateral-pin fixation in the treatment of displaced supracondylar fractures of the humerus in children.

**Methods:** It was a hospital based prospective study done between January 2009 to January 2011. Thirty four children (14 boys, 10 girls; age ranged from 3 to 12 years with the mean age of 6.6 years) were treated for displaced supracondylar fractures of the humerus. All patients had Gartland type 3 fractures. After closed reduction, two parallel lateral-pin fixations were performed. The mean duration of fixation was 3.9 weeks (range: 4 to 6 weeks). For comparison with the normal side, the Baumann and carrying angles were measured on anteroposterior and the humerocapitellar angle on lateral radiographs. The range of motion of the elbow was assessed clinically. The results were evaluated according to the criteria of Flynn et al. after a mean follow up of 12.6 weeks (range 12 to 16 weeks).

**Results:** Union was achieved in all the patients. Complications such as pin-tract infections, myositis ossificans, compartment syndrome, or nerve injuries did not occur. According to the criteria of Flynn et al., functional outcome was satisfactory in all the patients (100%). Nobody developed cubitus varus. No significant differences were found between the mean Baumann, humerocapitellar, and carrying angles of the normal and affected sides ( $p > 0.05$ ).

**Conclusion:** Closed reduction and percutaneous lateral pinning proved an efficient, reliable, and safe method in the treatment of displaced supracondylar fractures of the humerus in children.

## INTRODUCTION

Supracondylar fractures of the humerus represent 60% of all

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fractures around elbow joint with a peak incidence between 4 to 7 years of age in children.<sup>1</sup> Many different methods are described for the treatment of extension type supracondylar humeral fractures; however closed reduction with percutaneous pin stabilization is the current preferred method of treatment.<sup>2</sup> Two major complications associated with cross percutaneous pinning are iatrogenic ulnar nerve palsy and loss of reduction with development of cubitus varus/ valgus or a hyperextension deformity. But there is less chance of ulnar nerve palsy in

lateral pin fixation. The optimal pin configuration that provides an adequate stability of the fracture to maintain reduction and promote proper union while minimizing the risk of neurovascular injury is still a subject for many investigations.<sup>3</sup> In this study, we evaluated the results of closed reduction and percutaneous lateral-pin fixation in the treatment of displaced supracondylar fractures of the humerus in children.

## METHODS

Twenty-four children (14 boys, 10 girls; age ranged from 3 to 12 years with mean age of 6.6 years) who had Gartland type 3 fractures were included in the study. Closed reduction and percutaneous lateral pinning with the use of fluoroscopy was performed for all patients under general anesthesia. Patients with open fractures or other traumas and those who were treated with open reduction were excluded from the study. The direction of the displacement was posteromedial in 20 patients and posterolateral in 4 patients. Following the satisfying reduction under fluoroscopy, K-wires were inserted from the lateral condyle with the help of electric drill. The entry holes of the laterally inserted 2mm K-wires were opened at the distal fragment of the fracture. The wires were inserted vertically to the long axis of the humerus. Then, the wires were directed to the medial cortex of the proximal fragment. Taking into consideration of the anatomical location of the radial nerve, transecting the intermuscular septum posteroanteriorly, we inserted the wires from the posterior of the lateral supracondylar ridge to prevent the radial nerve injury. After the fluoroscopic control, the pin directing medially was positioned at the medial cortex without penetrating it. So the ulnar nerve was located at this level and not being very mobile, was protected. Provided these pins are not very long, the pins were released after penetrating the medial cortex. All the pins were bended and left out of the skin to prevent their migration. The motion of the elbow was examined under general anesthesia and the carrying angle was evaluated subjectively at the extension of the elbow. The quality of the reduction was accepted as good when the flexion was 110 degrees or more. After the last fluoroscopic control, the elbow was placed in a splint at approximately 90° flexion. The pins were kept parallel in all children. Three K-wires were used in four patients to augment the stability and two K-wires in twenty patients. The operating surgeon's own decision was effective in choosing either 2 or 3 wires. All the patients were observed 24 hours for edema and neurovascular complications postoperatively and the next day they were discharged after the radiographic control. Radiological and clinical controls were made with one week periodic time. The pins were removed after radiological healing and then active exercises were started. The mean duration of fixation was 3.9 weeks (range 4 to 6 weeks). At the last follow up, anteroposterior and lateral radiographies were taken. Baumann's angle was measured on anteroposterior radiographs and humerocapitellar angle were measured on lateral radiographs. The results were compared with the normal side. The range of motion of the elbow was assessed clinically. The results were evaluated according to the criteria of Flynn et al, after a mean follow up of 12.6 weeks (range 12-16weeks).

SPSS version 7.5 was use for statistical analysis and t test for comparisons.

## RESULTS

Union problems, pin-tract infections and myositis ossificans did not occur. No patient had pain or iatrogenic nerve palsy and compartment syndrome did not occur in any patient. Vascular impairment of a patient who had median nerve palsy and weakness of distal pulses at presentation improved after closed reduction. Also the neural deficiency disappeared later. No neural deficiencies were noted at the final follow up. After the examination of both elbow with a goniometer, in 3 patients (12.5%) the flexion-extension gap was found within 5°, in 20 patients (83.3%) motion gap was 6-10° and in 1 patient it was 11-15° based on criteria by Flynn et al.

Table 1. Criteria of Flynn et al. for evaluation of the results

Results	Carrying		Cosmetic		
	Motion loss (°)	Number %	Carrying angle (°)	number %	
Satisfactory					
Excellent	0-5	3 12.5	0-5	2	8.3
Good	6-10	20 83.3	6-10	20	83.3
Fair	11-15	1 4.1	11-15	2	8.3
Unsatisfactory					
Poor	>15	- -	>15	-	-

The carrying angle was measured and compared with the normal elbows. The were 0-5° differences in 2 patients(8.3%), 5-10° differences in 20 patients(83.3%) and 11-15° differences in 2 patients(8.3%) Functional and radiographic results were satisfactory in all patients (100%). At the final follow-up the mean Baumann's angle, humerocapitellar angle and carrying angle was 74.6°, 38.8° and 63° respectively on the injured side. There were no significant differences for these three values between the operated and the normal elbows (p>0.05).

## DISCUSSION

The incidence of supracondylar humerus fracture in children is 3%; many surgeons deal with this type of injury in their orthopedic practice and face with many problems. Closed reduction of the displaced fracture and maintenance of their position with a cast immobilization is difficult due to their anatomical features. The fractures may be displaced even after an anatomically reduction when the elbow edema disappears. The position of fracture stability is approximately 100° flexion of the elbow; however this position is not generally accepted because of its negative effect on the extremity circulation. Open reduction has many disadvantages. It prolongs the hospitalization time, has risk of infection and also yields to restriction of the elbow motion due to the soft tissue scars of the surgical intervention. Closed reduction and percutaneous pinning is preferred as a current treatment modality which

avoids these problems.<sup>3</sup> However, iatrogenic nerve injury and loss of reductions are the two major complications associated with this method. Cubitus varus/valgus or a hyperextension deformity develops after a loss of reduction. To prevent these deformities, an anatomic reduction should be performed and stable osteosynthesis should be achieved in this position. The best configuration for the stabilization of the osteosynthesis is controversial in the orthopedic literature. Zions et al.<sup>4</sup> investigated the torsional strength forming minimal 10° internal rotation at flexion in human cadaver, and compared the results. In this study, they noted that two medially and laterally crossed pins were the most strongest. Two crossed lateral pins followed this model than the two lateral pins. A biomechanical comparison of all pin configurations were performed by Lee et al.<sup>5</sup> in extension, varus, valgus, internal rotation and external rotation using a pediatric synthetic bone model. Divergent configuration laterally to prevent ulnar nerve palsy had enough stability but in axial rotation testing, this type of configuration had less stability than other configurations. In this study divergent pins provided more stability than crossed pin in extension, and varus testing. Herzenberg et al.<sup>6</sup> using a canine fracture model, demonstrated the best results with crossed medial and lateral pins. These are all in-vitro studies. Different results are achieved with comparative in vivo studies. Topping et al.<sup>7</sup> found no significant differences in early and late postoperative Baumann's angle between crossed-pin group and lateral-pin group. Enough stability was achieved with laterally placed parallel pins for fracture reduction. Authors have recommended crossed pin fixation for open fractures or for fractures which need vascular repairment. Skaggs et al.<sup>8</sup> found no ulnar nerve palsy and no reduction was lost in 124 children managed with only lateral-entry pins. In another study of Skaggs et al.<sup>9</sup> of 141 children who had Gartland type-2 fracture, seventy-four were treated with lateral pins only and sixty-seven were treated with crossed pins. Of 204 children who had a Gartland type-3 fracture, fifty-one were treated with lateral pins only and 153 were treated with crossed pins. The configuration of the pins did not affect the Baumann's angle in both Gartland type-2 and Gartland type 3 fractures. Reynolds and Jackson<sup>15</sup> found no differences in results between the two different methods. They suggested that stability depends on three factors that are under the control of the surgeon: the size of the pin, the distance between the pins along the line of the fracture, the pins being in the bone on both sides of the fracture. Solak and Aydin<sup>16</sup> believed that for any orthopedic surgeon who treats type 3 supracondylar fractures, there is no difference in the results between crossed pinned and lateral pinned fixation but that the experience of the treating surgeons is the most important factor in obtaining a good final outcome. France and Strong<sup>10</sup> also noted no difference between 32 lateral fixed pins and 14 crossed pins of 46 patients' results. However they observed ulnar nerve palsy in the crossed-pin group. Although the results showed no difference, some authors who believed the biomechanical superiority of crossed pins preferred specific crossed-pin technique to decrease the ulnar nerve injury. Green et al.<sup>17</sup> performed cross-pinning with a medially mini-open incision. Shannon et al.<sup>18</sup> preferred Dorgan's pinning- configuration

method after closed reduction to avoid the iatrogenic ulnar nerve injury. Following reduction, the two wires were introduced through the lateral condyle across the fracture and were crossed above the fracture line. The wires which were driven into the medial condyle did not penetrate the medial condyle. Cubitus valgus and varus deformities of supracondylar humerus fracture did not develop as a late complication of these fractures. An initial displacement which is not corrected by surgery contributed to these deformities<sup>11</sup> In vitro studies were unable to assess the resistance of the thickened periosteum of children to displacement after reduction and pinning; also the addition of a long-arm splint provides additional resistance to rotational and angular displacement. The inter-digitation at the fracture site in a well-reduced in vivo fracture cannot be simulated by an in vitro model. Crossed-wire pinning which is the most resistant pin configuration in many biomechanical studies is commonly accepted fixation method. However, there are some authors who advocated the use of the third wire to prevent the displacement of the distal fragment.<sup>12,13</sup> According to Skaggs et al.<sup>8</sup> the crossing of the wires or the number of wires are not very important, but the engagement of the sufficient bone in the proximal and distal fragment is more important. Maximum separation of the pins at the fracture site is very important for the biomechanical stability. Kallio et al.<sup>19</sup> advocated that the pins should be aimed toward the posterior cortex at an angle of 10° with the diaphyseal axis. Special attention should be directed for optimum pin placement with the lateral techniques. The use of a third pin requires the more medial pin to enter the joint and thus increases the risk of joint penetration and infection. It is suggested that the most appropriate way was to position the divergent pins on the lateral cortex. In our study, the pins were directed to the posterior cortex of the humerus in the patient who developed cubitus varus deformity. We preferred the use of two pins laterally to decrease the risk of infection. We used the third pin for the old children or large bones, when a good stability was not achieved. Lee et al.<sup>5</sup> suggested that the medial epicondyle is in a relatively posterior position anatomically, so the medial pin of the crossed-wires is typically inserted in a slight posterior to anterior direction. This also may allow increased anterior opening at the fracture line and results in loss of reduction. The commonly known complication in the treatment of closed reduction and percutaneous pinning of displaced supracondylar fractures of the humerus is iatrogenic ulnar nerve palsy with the use of medial pin.<sup>20</sup> The rate of ulnar nerve injuries varies in different studies. Lyons et al.<sup>21</sup> have reported this number as 6 %, Royce et al.<sup>22</sup> as 3%, Aufl et al.<sup>23</sup> as 58 %. According to Ippolito et al.<sup>24</sup> the difference in the incidences was a result of neurological examinations which were not well detailed. Also the examinations of the children in the emergency room were hard to detect the neurological injuries. So the incidences may be higher.<sup>22</sup> And also the hypothesis of hyperflexion of elbow during placement of the medial pin increases the risk of nerve injury was also suggested.<sup>9</sup> It is found that postoperative nerve palsies after percutaneous pinning was with direct injury to the nerve, not after manipulation of closed reduction.<sup>17</sup> Skaggs et al.<sup>9</sup> noted the incidence of ulnar nerve injury as 4% in patients

whom the pins were applied without hyper flexion of the elbow and as 15% in whom the medial pin was applied with the elbow hyper flexed. Different techniques are performed to decrease the rate of ulnar nerve injury. Wind et al.<sup>25</sup> advocated the use of ulnar nerve stimulation with a stimulator or K-wire for identification of nerve location. Royce et al.<sup>22</sup> performed a short medial percutaneous incision for the swollen elbows. Also it is suggested that the mechanism of the nerve injury is not only due to direct penetration of the nerve but also due to the iatrogenic construction of the nerve by the cubital tunnel retinaculum. In cases of swelling, there is a risk for medial pinning and also the retraction of skin around the pin is also a potential risk for injury.<sup>26</sup> It is also showed that lateral-pins decrease the rate of ulnar nerve injury when compared with medial-pins, however this method has not accomplished the risk. Foed et al.<sup>27</sup> noted 2 ulnar nerve injuries of laterally pinned 32 patients and 5 ulnar nerve injury in 34 medial-lateral pinned group. Subsequent follow up was done weekly. All of them recovered at the end of the 6th month. Radial and interosseous nerve palsies are also noted in the laterally pinned supracondylar humerus fractures. Shannon et al.<sup>18</sup> noted 3 interosseous nerve injuries of 20 patients, and Foed et al.<sup>27</sup> noted 2 radial nerve injuries of patients of 32 patients. We did not note any injuries of these nerves. This may be coincidental; however the entry holes of the both pins were in the distal fragment in our technique, also the pins were directed from the lateral supracondylar ridge of the humerus. These applications may be effective in the results. Although most of the ulnar nerve injuries recover spontaneously between 4 and 6 months, permanent damage have been reported in the literature.<sup>26</sup> Lyons et al.<sup>21</sup> observed spontaneous functional recovery after the removal of medial pin. However, Rasool<sup>26</sup> advocated the early exploration of the nerve. Clawing of the fingers may occur rarely after ulnar nerve injuries. Pathological electromyography measurements can be detected in most of ulnar nerve injuries during the early postoperative period. This condition is miserable for the child's family and the surgeon. Iatrogenic nerve injuries are gaining importance currently in our country while new rules are put in order to judge these malpractices.

## CONCLUSION

We concluded that our results are successful with the application of our surgical method. The main goal of the treatment of displaced pediatric supracondylar humerus fractures is to achieve an anatomic reduction. This reduction should be supported by a fixation with a good stability and less morbidity. When all these are taken into consideration, we believe that closed reduction and percutaneous lateral pinning is an efficient, reliable and safe method.

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# The Study Determining the Indication and Early Complications of Tracheostomy in Tertiary Care Health Institution in Eastern Nepal

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## Key words:

Tracheostomy, Upper air way obstruction, Tumor larynx, Stomal infection

## ABSTRACT

**Objective:** To assess the indications and early complications of tracheostomy in a tertiary health care institution.

**Methods:** It was a retrospective study done in BP Koirala Institute of Health Sciences, Dharan, Nepal from 2005- 2008. Medical records of 175 tracheostomized patients were reviewed. Demographic variations, indications and outcome were recorded and analyzed.

**Results:** The total numbers of cases were 175. Age ranged from 1 to 88 years. The most common age group was 21-30 years followed by 51-60 years. The commonest indication for tracheostomy were upper air way obstruction (34.3%), followed by prolong intubation (20%). Common diagnoses were tumor of larynx/hypopharynx (26.3%), infectious causes (20.6%) and cut throat injuries (13.7%). Stoma site infection (4.5%) was the most frequent early complication.

**Conclusion:** Most common indication for tracheostomy in tertiary care health institution in Eastern Nepal was upper airway obstruction. Procedure is safe if done properly.

## INTRODUCTION

Tracheostomy is one of the oldest operations in the history of surgery. It is channel between the trachea and skin in the midline of the neck. In 1921 Chevalier Jackson modified indications and techniques for modern tracheostomy.<sup>1</sup> Today tracheostomy is most commonly performed in patients with upper air way obstruction and prolong intubation. Although cricothyroidotomy and percutaneous tracheotomy are available alternatives, open method of tracheotomy provides more rapid and safe method to secure airway.<sup>2</sup> The commonest indication

of tracheotomy has changed from inflammatory causes in the past to the present day prolonged intubation.<sup>3</sup>

Aim of this study was to find out the indication and early complication of Tracheotomy at tertiary care health institution in Eastern Nepal

## METHODS

It was a retrospective study, comprising of patients who underwent tracheostomy from January 2005 to December 2008 at BP Koirala Institute of Health Sciences (BPKIHS) at Dharan, which is situated in eastern Nepal. The study proposal was reviewed and approved by BPKIHS ethical committee. Data was obtained from inpatient records and operative notes from otorhinolaryngology (ENT) ward, operation theatre (OT), intensive care unit (ICU), internal medicine and surgery ward. Total of 175 patients who had undergone tracheotomy were included in this review. Biostatistical data on age, sex,

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indication for tracheotomy, procedure detail, co-morbidities and outcome were extracted. Tracheotomy procedure was performed on an elective or emergency basis, either under local or general anesthesia in the operating room & ICU. All data were compiled and analyzed by SPSS 17.0 version.

## RESULTS

Total of 175 patients had undergone tracheostomy during the study period. The age of the patients ranged from 1-88 years with the mean age of 44 years. Of the total, 123 (70%) were male and 52(30%) were female. The male to female ratio was 2.4:1. The majority of patients were in third decade, consisting of 40 (22.9%) cases followed by sixth decade consisting of 33 (18.9%).

Table1. Age distribution of Patients.

Age group	No of patients	%
<10	7	4
10 - 20	15	8.6
21 -30	40	22.9
31 -40	22	12.6
41-50	20	11.4
51-60	33	18.9
61-70	24	13.7
71-80	11	6.3
81-90	3	1.7
Total	175	100

The most common indication was stridor in 34.3% patients followed by prolong intubation in 20% and cut throat injuries in 13.7%.

Table 2. Indication of Tracheostomy.

Indication	No of Patients	Percentage(%)
Upper airway obstruction	60	34.3
Prolong intubation	35	20.0
Repair neck cut injury	24	13.7
Anticipated laryngospasm	20	11.4
Laryngeal oedema	16	9.1
Respiratory failure	12	6.9
Difficult inbutation	6	3.4
Respiratory paralysis	2	1.1
Total	175	100

Of all patients, tumor (26.3%) and infectious diseases (20.6%) and trauma neck (13.7%) were common diagnosis.

Table 3. common diagnosis of tracheostomised patients.

Diagnosis	No of patients	percentage
Tumor of Larynx, Hypopharynx	46	26.3
Infection (Neck abscess, tetanus)	36	20.6
Cut throat	24	13.7
Burn	14	8.0
Poisoning (OrganoPhosphorus)	12	6.9
Medical condition (COPD, DKA,ACS,GBS*)	11	6.3
Surgical ( head injury, laparotomy)	9	5.1
Granulomatous disease (tuberculosis, sarcoidosis)	6	3.4
F.B. Trachea	5	2.9
Bite (bear ,snake)	4	2.3
Mandible fracture	2	1.1
Gynaecological condition (eg Ectopic pregnancy)	3	1.7
Gun Shot injury	2	1.1
Post Thyroidectomy	1	0.6
Total	175	100.0

\*COPD= chronic obstructive pulmonary disease,DKA=diabetic ketoacidosis, ACS=Acute coronary syndrome,GBS=Gullien Barrie Syndrome.

There were 40 patients in the age group of 21-30 years, among whom trauma 14 (35%) and tetanus 8 (20%) were the common indications for tracheotomy. The common indications of tracheotomy in the age group of 51-60 years were tumors 16(48.5%) and neck trauma 7 (21.2%). Surgical access to the airways was successful in all the patients. Complication were seen in 23(13.2%) of cases. Stoma site infection was found in 8 cases (4.5%), peri-operative hemorrhage in 6 cases (3.6%), early post operative surgical emphysema in 4 cases (2.3%) and difficult decanulation in 5 cases (2.8%) .There were no deaths due to the procedure.

## DISCUSSION

Chevalier Jackson established the standard modern indication and technique of tracheotomy.<sup>1</sup> In recent years the majority of the tracheotomies are performed electively in intubated patients in intensive care units.<sup>4</sup> However, one of the most important indications for tracheotomy is upper airway obstruction. The establishment of an emergency surgical airway for acute upper airway obstruction becomes critical when establishment of the airway by other means fails or is not possible.

Tracheotomy was commonly performed in 21-30 years age group followed by 51-60 years age group in this study. Cut throat injury, poisoning & RTA requiring tracheotomy were found in 21-30 year age group where as cancer of larynx and hypopharynx were common indication for tracheotomy in 51-

60 years age group. Commonest indication of tracheostomy in our study was upper air way obstruction (34.3%) followed by prolong intubation (20%). Similar finding were found on study done by Babu et al<sup>5</sup> in rural India and Orji et al in Nigeria.<sup>6</sup>

Laryngeal/hypopharyngeal tumor was found in 26.3% of cases. High tracheostomy was done for those cases. Though incidence of the stomal recurrence increases with such tracheostomy procedure,<sup>7</sup> the tracheotomy was inevitable in those cases who presented with stridor. The observed number of patients in the age 51-70 years could be explained by the predominance of carcinoma of the larynx/hypopharynx as the cause of upper airway obstruction. The 5th and 6th decade of life tend to be more affected and there may be a positive history of ingestion & smoking which are strong etiological factor for development of head and neck malignancies.<sup>8</sup>

All cut throat injuries were above the level of cricoid cartilage exposing laryngeal and hypopharyngeal lumen. Seven of the cut throat injuries were homicidal injuries and rest were suicidal. Suicide is one of the 10 leading causes of death in the world with more than a million deaths occurring annually.<sup>9</sup> It occurs 20.4 times more frequently in individuals with major depression than the general population and therefore these patients will require psychiatric intervention.<sup>10</sup>

Though some authors support fibre-optic intubation for patients with Ludwig's angina and retropharyngeal abscess, we prefer to do open method of tracheotomy as a first choice.<sup>11</sup> The trial intubation can cause rupture of pus into the oral cavity with subsequent aspiration, airway oedema and laryngospasm further worsening the airway obstruction.<sup>12</sup>

Twenty-three (13.2%) of our patients experienced complications which was comparable to other studies.<sup>2,5</sup> Stoma site infection was seen in 8 (4.5%) cases which was managed by wound dressing and antibiotics treatment directed by culture and sensitivity test. Haemorrhage due to thyroid isthmus was encountered in 4 cases and due to anterior jugular vein in 2 cases. Both these cases were managed efficiently by achieving complete haemostasis. Early post operative surgical emphysema was found in 4 cases (2.3%) which were lower than in study by Amusa YB et al (4.5%),<sup>8</sup> which had regressed spontaneously. Difficult decannulation occurred in 5(2.8%) cases which was slightly lower than study by Orji et al (3.8%).<sup>6</sup> Two cases were GB Syndrome and each case of bilateral recurrent laryngeal nerve palsy after blunt neck trauma, post- thyroidectomy and organophosphorous poisoning. All cases were successfully decannulated in 3 month after appropriate management.

## CONCLUSION

Most common indication for tracheostomy in tertiary care health institution in eastern Nepal was upper airway obstruction. Procedure is safe if done properly.

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## A word from Editor-in-Chief's desk

As the new Editor-in-Chief, I would like to thank the management of Gandaki Medical College and Editorial Committee of J-GMC-N who have put their trust in me and have considered me worthy of handling this position.

There has been some delay in processing the submitted manuscripts and bringing out the 2011 issue due to some unavoidable circumstances.

It is my pleasure to present before you the special edition of J-GMC-N, 2011. I am greatly thankful to all Editorial Committee members for their constant support and efforts in rapid processing of articles.

Good original research articles based on the genuine research work carried out in our institutes are the need of the hour to improve the quality and status of J-GMC-N. Proper planning, collaboration and execution is required for good research and its publication in the form of original articles.

I invite you all to participate actively by contributing original research articles, case reports/series, review articles, editorial articles, images and letters to editor.

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With best wishes.

Dr. K. Rajeshwar Reddy

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